FEBRUARY, 1955

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Finishes on *Metal* Products

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Liquabrade

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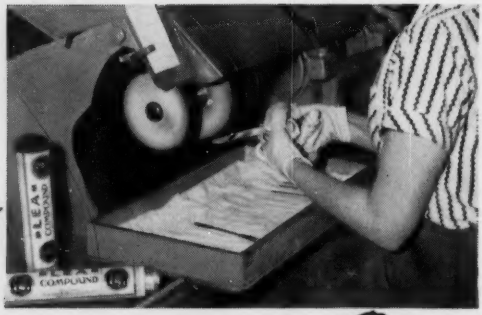

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FEBRUARY, 1955

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Your Monthly Source For Finishing Ideas

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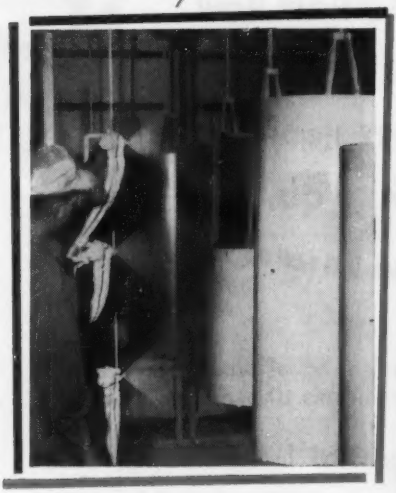

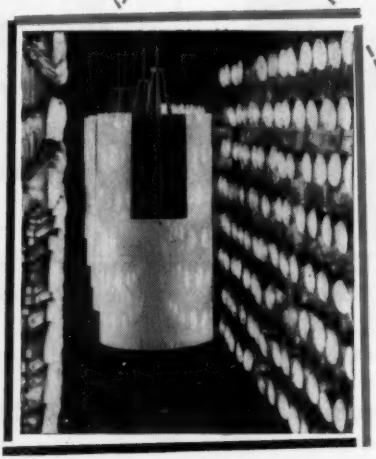

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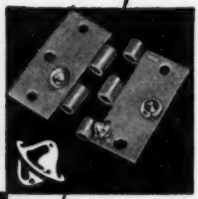

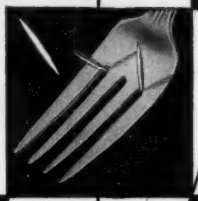

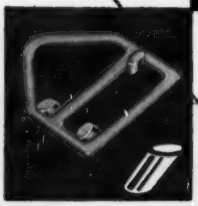

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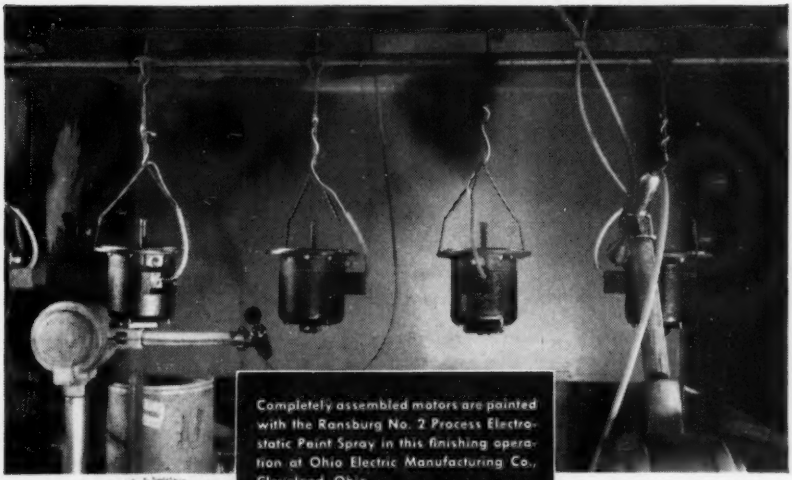

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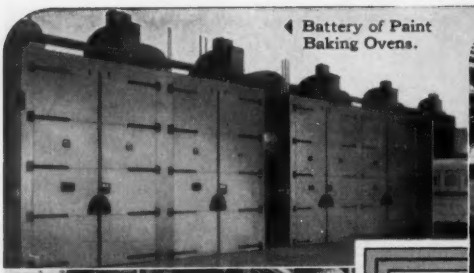
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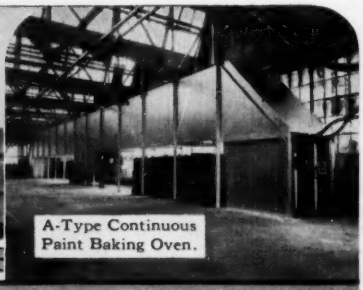
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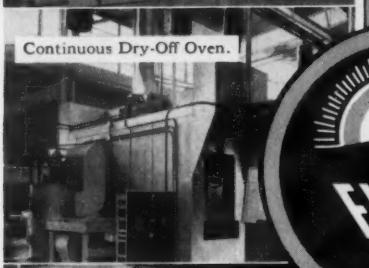
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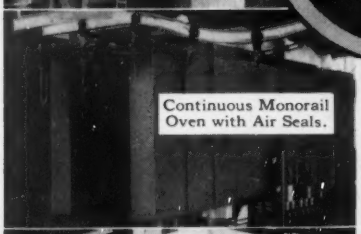
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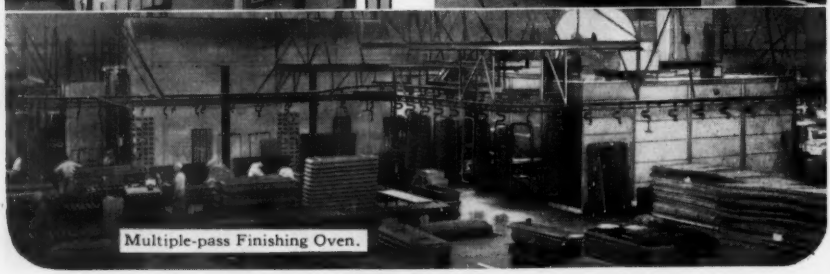
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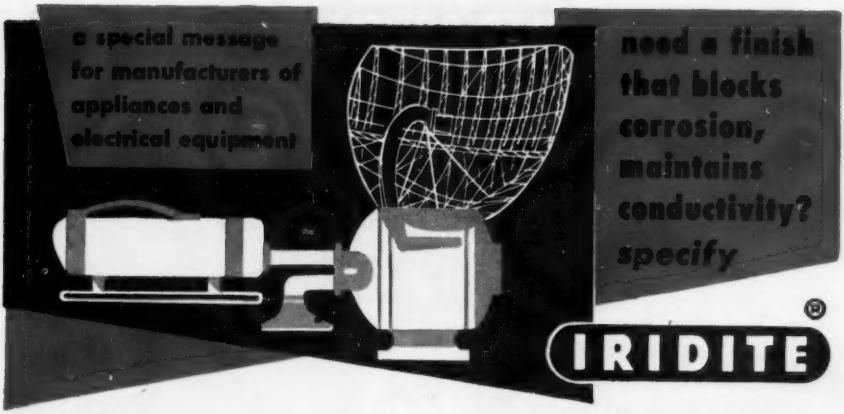
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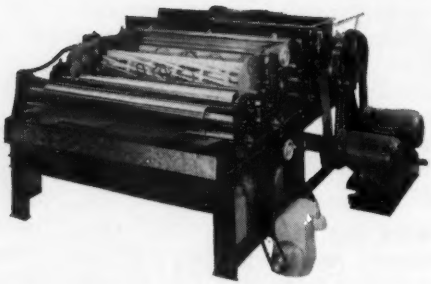

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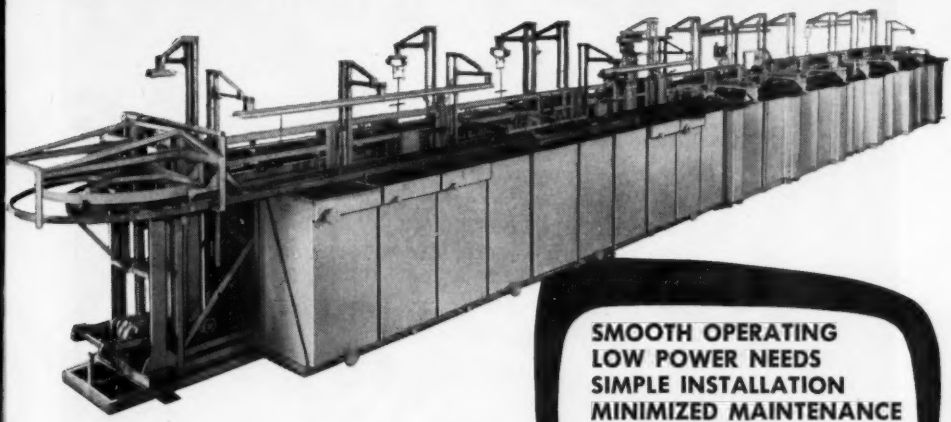

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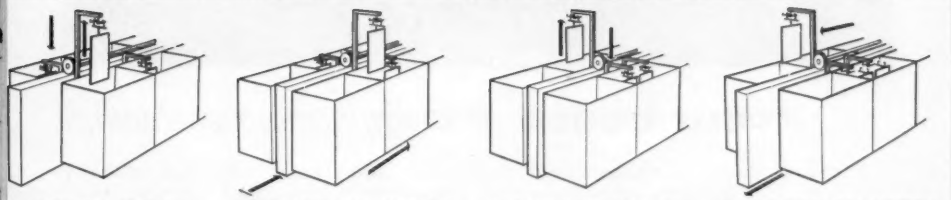

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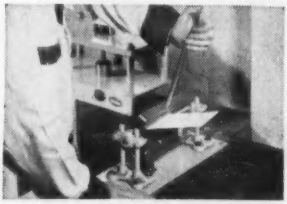

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Your Cowles Technical Representative will be very happy to discuss your soak cleaning problems with you and help bring the same exceptional results with Cowles NS that this and many other plants have experienced. Write or call today.

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Pf editorial

Vol. 19, No. 5

FEBRUARY, 1955

FINISHING METHODS

The Finishing Supervisor or Finishing Engineer today has a wide variety of ways in which to apply the finishes which add beauty and utility to the products of American Industry.

Metallic finishes may be applied by electroplating, chemical reduction, gas plating, vacuum metallizing, metal spray, dipping in molten metal, and immersion in aqueous solution.

Surface conversion and anodic coatings may be produced on metal surfaces in a wide range of colors by electrochemical and/or chemical means. Included in this classification are the many processes of metal coloring.

Attractive finishes may be applied to some metal surfaces by polishing, buffing, electropolishing, chemical polishing, or barrel finishing processes.

Paint, varnish, lacquer, and enamel finishes are applied by brushing, spraying with air or steam as the atomizing medium, or without an atomizing medium. This latter process is known as Airless Spray. These organic finishes are also being applied by hot spray, dipping, flow coating, electrostatic spraying, tumbling, centrifuging, and by Aerosol spray.

Porcelain enamel is applied as a water slurry either by dipping or spraying, and the electrostatic spraying of this material is well along toward successful accomplishment.

When special plastic formulations are applied to metal products, coating methods used include dipping, flame spraying, and spraying with a catalyst spray gun.

Many of these processes have been made semi-automatic or automatic, or built into a conveyorized finishing system as production conditions have demanded. The choice of process is made, in part, by weighing cost of equipment, cost of production, and appearance and value of the finished product.

It should be emphasized that the development of finish application methods has been accompanied (or preceded) by developments in finishes. Finish suppliers and finishing equipment suppliers have both contributed to industry progress.

When the individual Finishing Engineer is faced with the problem of applying a specified finish to a certain product, he may be somewhat bewildered by the wide range of methods available. He will find the technical staffs of finish and equipment suppliers most helpful in making recommendations that will aid him in deciding upon the right finishing method for his product and his plant.

Ezra A. Blount

—EDITOR

Notes on Electroplating Metallized Surfaces

By SAMUEL WEIN

THE conducting films deposited by any of the methods commonly used may be made more conducting, or the film may be thickened and used for subsequent purposes by electroplating with various metals.

Electroplating may likewise be used as a protecting medium as is done in mirror manufacture when the silvered film is reinforced with a copper film. Further uses for electroplated metallized surfaces are for finishing purposes as in the case of buttons and novelties. Metallized surfaces may be plated to form an improved surface for soldering.

Making Contact

The first step in electroplating a surface that has been metallized is to make a good electrical and mechanical contact to it. A small article can be very readily handled by twisting several strands of thin gauge copper wire around it. On larger pieces contact should be made at several points, exercising care that this does not in any way interfere with the electroplated or deposited metal. Such contacts might otherwise leave a spot at the point of contact where the electroplated metal is either deposited in a lump or not at all. Pressure, clips or other means may be used to make contact for large pieces in any convenient form.

Small buttons, toys, and novelties may be processed in a plating barrel.

Copper Plating Solutions

Bandes pointed out in his review of the literature up to the year 1945, that copper can be electrodeposited from a wide variety of solutions and at different physical conditions.

On a tonnage basis, the acid copper solution is the most important of all plating solutions in that it is used not only for electroplating, but also for electroforming, electrotyping, and electrolytic copper refining.

If one were to look through the literature, according to Winkler, he would soon find that the acid copper bath varies in composition:

Copper sulfate	100 to 250 gm./l.
Sulfuric acid	45 to 100 gm./l.

These solutions are usually operated at 70 to 131 deg. F. and at current densities from 25 to 60 amperes per square foot.

The Hanovia Chemical Co. has recommended the following acid copper sulfate solution in connection with fired metals on glass and similar surfaces:

Copper sulfate	32 oz./gal.
Sulfuric acid	6 oz./gal.
Temperature	Room
Current density	0.15 amp./sq. in.
Voltage	4-6 volts
Anode to cathode ratio	1:1, 2:1, 3:1

Schreiber electroplated silvered glass surfaces from an acid copper sulfate bath at 25 deg. Be′ using 5

to 15 amperes for 5 to 15 minutes.

Laux suggested the following copper sulfate plating solution as being preferred for forming thick deposits of copper on the silver film:

Copper sulfate	200-300 gm./l.
Sulfuric acid	15-40 gm./l.

The solution has a pH of about 1.1 to 0.9.

Narcus recommended the deposition of a very thin film of copper on the conducting surface from a diluted copper sulfate bath, thereafter transferred it to a conventional acid copper sulfate bath.

Morgan and Myers suggested the use of the following solution:

Copper sulfate	200 gm./l.
Sulfuric acid	75 gm./l.

at 40 milliamperes per square inch. This solution may be used repeatedly until it becomes exhausted.

A copper plating solution recommended by Bregman consists of an aqueous solution of copper sulfate with the addition of much less sulfuric acid than usual and ammonium hydrosulfate.

The following acid copper sulfate bath has been suggested for use with silver painted surfaces:

Copper sulfate 27 oz./gal.
Sulfuric acid 6½ oz./gal.

The voltage is between 0.75 and 2, and the current density is between 15 to 40 amperes per square foot, and the temperature of the solution is held between 75 and 120 deg. F. Rolled annealed copper anodes are recommended.

Addition Agents

Various types of organic and inorganic compounds have been recommended for use with acid copper plating solutions in order to effect a finer grain, or a brighter deposit. Hull and Blum should be consulted for a review of addition agents.

Dextrin, castor oil, glue (gelatin), molasses, corn syrup, are recorded in the literature.

Bregman added about 0.025 per cent of commercial molasses to the acid copper sulfate solution.

Another formulation of the acid copper bath containing molasses and thiourea as addition agents was claimed by Clifton and Phillips, who reported that the deposited copper was bright at current densities as high as 75 amperes per square foot.

Solution Agitation

Solution agitation, to produce a smoother plate, can best be accom-

plished by means of a small compressor discharging air under low pressure. On the other hand, if the work is to be agitated, this can be done by revolving it slowly by means of a slow speed motor, or by oscillation, or other means convenient to the worker. Some plants make use of the combined effects of solution agitation with compressed air and mechanical agitation of the work.

Copper Tartrate

VonLiebig recommended neutral copper tartrate solution for plating copper direct on the silvered surface. The copper tartrate is freshly prepared from a 25 per cent solution of copper sulfate to which is added 28 parts sodium potassium tartrate (Rochelle salt) dissolved in 28 parts of water. Since the addition precipitates copper tartrate out of solution, sufficient sodium hydroxide or ammonia is added to redissolve the precipitate first formed. To one volume of this solution there is now added an equal amount of water. This latter solution is used as the electrolyte (copper tartrate) for plating copper on the silver film formed on glass and other insulating surfaces.

Smith (R. D.) formed a silver mirror by the Brashear method, then plated it with a film of copper from a 10 per cent solution of potassium bitartrate saturated with basic copper carbonate and then made slightly alkaline with potassium carbonate. A current density of 0.1 to 0.002 amperes was used.

French used the same solution as above but at a current density of 0.25 amperes per square decimeter.

Ansley's version of the copper tartrate solution consisted of:

Rochelle salts	150 gm./l.
Copper sulfate	60 gm./l.
Sodium hydroxide	50 gm./l.

Copper tartrate with or without the addition of mono, di or triethanolamine, according to Schweitzer, gave satisfactory results for plating on silvered surfaces. Such a solution consisted of:

Copper sulfate	25 gm./l.
Rochelle salts	15 gm./l.
Triethanolamine	30 gm./l.

Silvering Compound

The compound, "Oxalto Compound," accredited to Morgan and Myers in connection with their version of the silvering process, is composed of the following:

Copper sodium oxalate dihydrate	20 gm./l.

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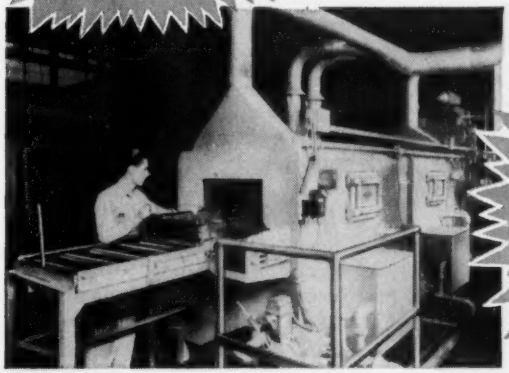

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Plating Metallized Surfaces

Sodium sulfate	15 gm./l.
Boric acid	20 gm./l.

The silvered surface is plated in this solution for 10 minutes at 20 milliamperes per square inch, then plated in acid copper for 12 hours.

Silver Films By Immersion

The following solution will produce a thin and homogenous film of metallic silver on the metallized surface. The process is one used mainly for the detection of poorly formed metallized films since there appears a color contrast between the formed silver and the metal beneath it, and for increasing the electrical conductivity of the metallized film. The solution consists of:

Silver cyanide	4 oz./gal.
Sodium cyanide	4 oz./gal.

After the object has been treated with this solution, it is then washed with running water.

A modification of the above is:

Sodium cyanide	0.2 oz./gal.
Silver cyanide	0.5 oz./gal.
Sodium chloride	0.5 oz./gal.
Temperature	180 deg. F.

Nickel Plating

VonLiebig suggested the following nickel plating solution for use with silvered glass surfaces. It is an alkaline solution of:

Nickel sulfate	1 part
Water	40 parts

to which an excess of ammonia is added to redissolve the precipitate first formed.

Crocker suggested:

Nickel sulfate	14 oz./gal.
Boric acid	1 oz./gal.

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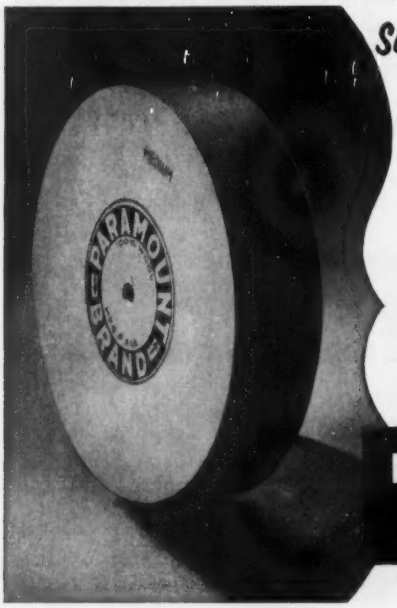

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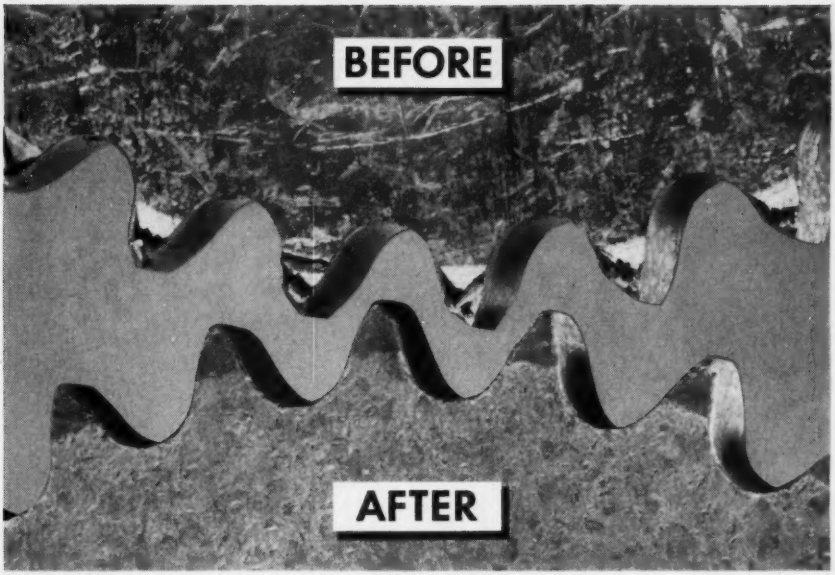

BEFORE AND AFTER *photos show how the HONITE Method finishes steel roller chain sprockets. Note how smoothly and evenly the stubborn hobbing burrs have been removed.*

Milwaukee manufacturer finds . . .

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The Chain Belt Co., of Milwaukee, Wisconsin, makes 7½" diameter steel sprockets for roller chains. On this unit the company cut two finishing steps to one . . . cut finishing costs from 6½¢ per unit to 2½¢ . . . cut finishing time by 35% . . . when they switched to the Honite Barrel Finishing Method.

Here's how. The firm formerly used grinding and hand-filing methods to remove hobbing burrs and de-scale and de-grease sprockets. Now, with the Honite Method, these steps are performed simultaneously. Parts are cleaner, with a more uniform finish; burrs and scales are eliminated completely.

Find out today how Honite Barrel Finishing Methods can increase your production, cut unit costs, give better, more uniform finishes faster. Call your Honite Methods Engineer or nearby Honite Distributor for complete facts, or write Minnesota Mining and Mfg. Co., Dept. PF-25, St. Paul 6, Minn., for FREE copy of "Facts and Figures Report on HONITE Barrel Finishing."

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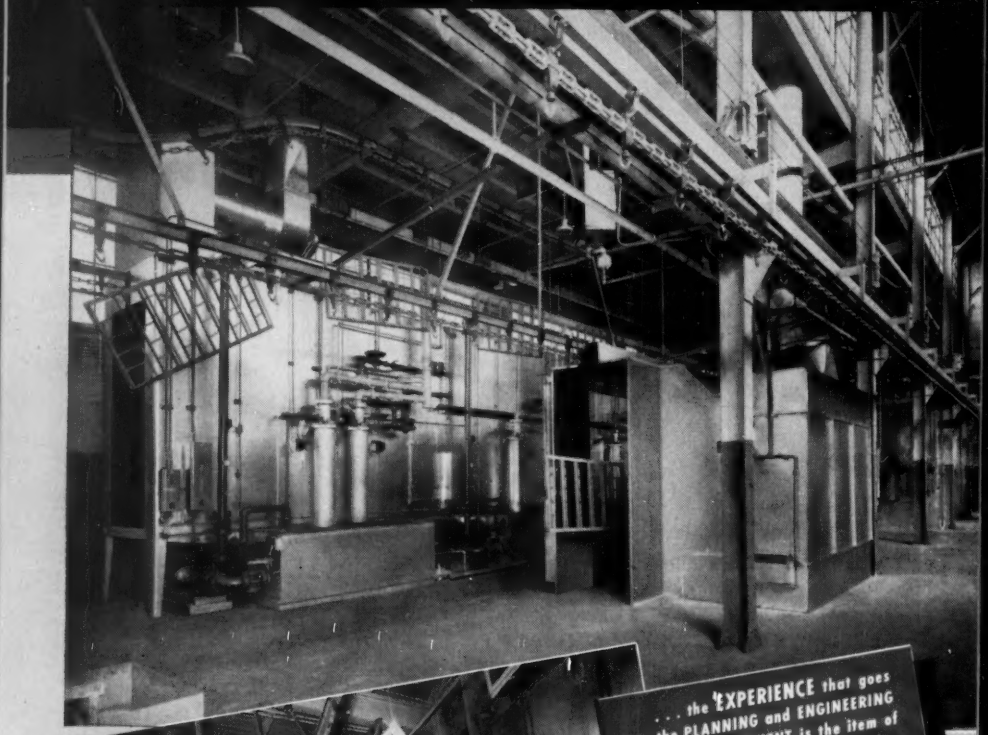

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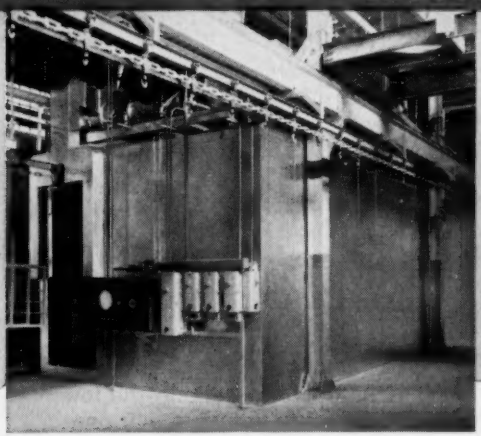

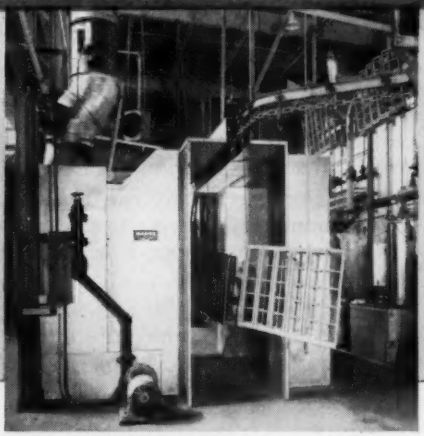

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When the Color-Craft organization in Detroit decided to go into the contract painting business, the two most convincing points in selling this painting service to manufacturers were Color-Craft's know-how, backed by over twenty-five years of experience, and new, modern processing and coating equipment and other facilities capable of producing at minimum cost the fine finishes demanded in today's highly competitive market. Color-Craft turned to Mahon for the type of equipment deemed necessary for a successful and profitable operation. Mahon planned, engineered, built and installed a complete finishing system flexible in its cleaning and pre-paint processing of metals and capable of handling the wide variety of shapes and sizes in parts and products encountered in this type of finishing operation.

The choice of Mahon Equipment was not only a wise decision, but a logical one in this case, because more automobiles and more home appliances are finished in Complete Mahon Finishing Systems than all other types combined—an indisputable tribute to Mahon's performance in this highly specialized field. If you are contemplating new finishing equipment, you, like thousands of other quality-minded manufacturers, will find that Mahon engineers are better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better for more economical operation over a longer period of time. See Sweet's Plant Engineering File For information, or write for Mahon Catalog A-655.

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MAHON

Plating Metallized Surfaces

Spiro and Wohlgemuth recommended the following acid nickel solution for heavy electroforming on silvered surfaces:

Nickel sulfate	220-340 gm./l.
Cobalt sulfate	6.28-22 gm./l.
Boric acid	25.2-37.7 gm./l.
Sodium fluoride	6.28-15.70 gm./l.
Sodium chloride	1.57-12.58 gm./l.

To this solution there now is added 0.044 to 0.22 gm./l. cadmium oxide, then the solution is filtered.

Addition agents suggested are 1-3-6 sodium naphthalene trisulphonate, 1 to 5 grams per liter of the above nickel solution.

The temperature is between 95 and 110 deg. F. and the current density is between 8 and 25 amperes per square foot.

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Wesley and Prine of International Nickel Co. recommended the following solutions:

Nickel sulfate	16 oz./gal.
Ammonium chloride	2 oz./gal.
Boric acid	2 oz./gal.

A brightener in the form of gum tragacanth, gum arabic or cadmium may be added.

A solution exhibiting a very flexible range of operating conditions with respect to composition, current density and temperature is made up of:

Nickel sulfate	32 oz./gal.
Nickel chloride	6 oz./gal.
Boric acid	4 oz./gal.

The pH is 4.5 to 6.0; the working temperature is between 115-160 deg. F., and the current density between 20 and 100 amperes per square foot.

It is desirable to operate the low pH Watt's solution at a higher temperature range to obtain faster plating and better throwing power, hence the following composition:

Nickel sulfate	44 oz./gal.
Nickel chloride	6 oz./gal.
Boric acid	5 oz./gal.

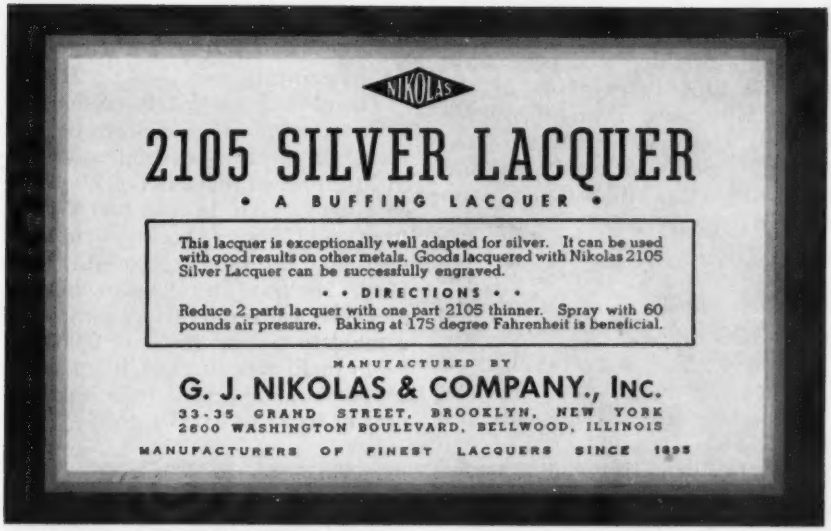
The pH is between 1.5 and 4.5, the working temperature 115 to 140 deg. F., and the current density between 25 and 100 amperes per square foot.

The chloride bath recommended by Wesley and Carey, is made up of:

Nickel chloride	40 oz./gal.
Boric acid	4 oz./gal.

The pH is 2.0, the working temperature 140 deg. F., and the current density is between 25 and 100 amperes per square foot.

Pinner and Kinnaman have shown that a high concentration of nickel chloride, to produce approximately a 50-50 nickel chloride-sulfate solu-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tion, will produce a deposit with modified characteristics of the Watt's solution and the all-chloride solution. The increased chloride concentration produces a smoother, finer grained, easier buffed deposit with less tendency to pit. It is made up of:

Nickel sulfate	26 oz./gal.
Nickel chloride	23 oz./gal.
Boric acid	5.3 oz./gal.

The pH is 1.5, the working temperature 115 deg. F., and the current density is 100 amperes per square foot.

This barrel plating solution has been formulated for decorative purposes, and is made up of:

Nickel sulfate	20 oz./gal.
Ammonium chloride	4 oz./gal.
Boric acid	4 oz./gal.
Temperature	Room

The pH is between 5.0 and 5.5.

Other workers also electroplated nickel on metallized surfaces. Wood in 1911 formed reflectors on a silvered glass surface. Inwald and Waldtreu, and likewise Crocker, made reflectors in the same fashion. Milton, Cort, Nielson and Cowan plated nickel on a silvered surface for use as a mold to the thickness of 0.003 to 0.005 inch, then backed it up with copper from an acid bath to a thickness of 0.025 to 0.030 inch.

Iron Plating

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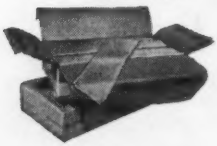

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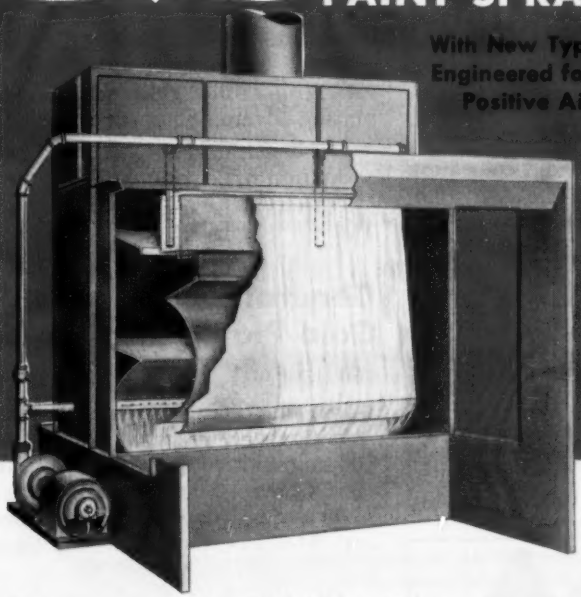
ALSO INDIVIDUALLY PACKED IN GLASSINE ENVELOPES —144 to the Carton

A WARRANTY OF SATISFACTION IN EVERY CARTON

DESPATCH

NEW WATER WASH PAINT SPRAY BOOTH

With New Type Baffle Chamber Engineered for 100% Efficiency Positive Air Cleaning Action



Entirely New! The new type baffle chamber provides a positive air cleaning action that prevents paint pigments, moisture and volatiles from reaching the exhaust stack or the outside of a building.

The new air scrubbing chamber features a specially-designed spray header mounted within two curved baffle plates. When water is pumped into the header it sprays from three rows of orifices and strikes the baffle plates, building up a violent spray turbulence that removes practically every last particle of paint.

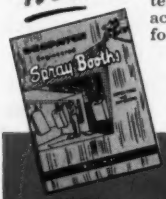
Lower Operating Cost by Actual Test!

NEW **Water curtain supply header** is located *outside* the plenum chamber for easy access. Vertical feeder lines do not interfere with tank adjustments.

NEW **Water Curtain Supply Tank** is completely adjustable. It provides a uniform, non-splashing flow of water that completely covers the curtain and prevents any paint accumulation.

NEW **Bleeder Line Keeps Header Clean** . . . keeps orifices from clogging. The new Bleeder line causes a continuous flow of water from the bottom of the header, preventing the settling of solids in the bottom of the pipe.

NEW **Fast-Action Removable Panels** permit easier maintenance. The entire interior of the booth is accessible in just 3 minutes, by removing just four fast-action clamps per section.



1. Will exhaust air containing not more than 5 grains of solid every 1000 cu. ft. of air handled.*
2. Will exhaust air containing not more than 50 parts per million solvent vapors.*
3. Will reduce down time for cleaning to a very minimum, thus increasing production.
4. Will prevent paint pigments, moisture and volatiles from reaching exhaust stack or outside of building.
5. Will thoroughly eliminate moisture from exhaust air, before it is exhausted.

**Based on spraying rate of approx. 3 gal. per hour per ft. length of booth.*

Write for Bulletin No. 66

Dept. C

Chicago Office: 4554 N. Broadway
Sales and Service in All Principal Cities

DESPATCH OVEN COMPANY

Ferrous sulfate	33 oz./gal.
Ferrous chloride	5.6 oz./gal.
Ammonium chloride	2.7 oz./gal.

The pH is between 3.5 and 5.5, the temperature is 90 deg. F., and the current density is between 50 and 100 amperes per square foot.

Gold Films By Immersion

For simple yellow gold coloration on copper films, as in the case of silver film formation by mere immersion, the following formulation is recommended:

Sodium cyanide	3 oz./gal.
Sodium gold cyanide	1½ oz./gal.
Sodium hydroxide	2 oz./gal.
Sodium bisulfite	2 oz./gal.

This solution should be boiled for one hour, replacing the evaporated water. During operation, a temperature of 180 deg. F. must be held.

A stone crock or an enameled steel container should be used. The finished articles require immediate lacquering to prevent "fading."

VonLiebig recommended the following alkaline gold solution for plating silvered glass surfaces:

Double chloride of gold	1 part
Sodium hydroxide	2 parts
Water	120 parts

★ ★ ★

General Motors Uses Gold Plated Trim on 50 Millionth Automobile

GOLD PLATED zinc die castings representing a large part of more than 600 automotive trim parts on the 1955 Chevrolet are one of the main luxury appearance features of General Motors' 50 millionth automobile, a gold Chevrolet.

All of these zinc die castings are standard 1955 production automotive trim parts specified by Chevrolet engineers. Of the more than 600 trim parts, 314 represent metal trim and accessories and more than 300 are fasteners, including nuts, bolts, screws and rivets. Steel components in this trim group were also gold plated.

To achieve the exact gold color specified by Chevrolet styling engineers for the zinc die castings, much care was exercised in plating.

To gold plate the zinc die castings, they were first given conventional preliminary copper and nickel coats. These coats prevent amalgamation of the subsequent plated gold with the zinc base metal. The parts

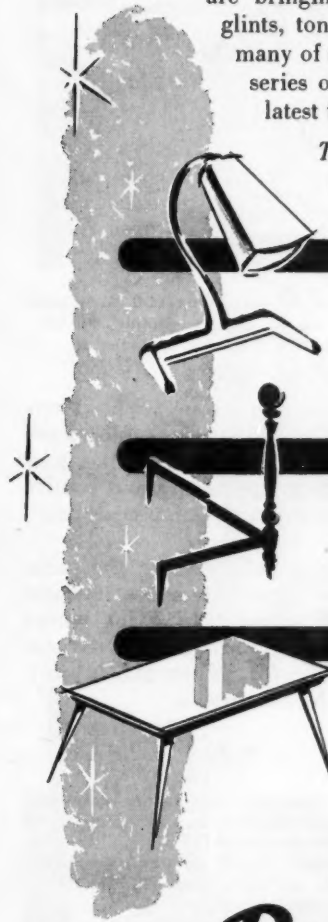
NICKELITE
BARREL NICKEL BRIGHTENER
cuts brightening costs — concentrated to quadruple strength—shipping weight is cut 275%. You don't ship, store or handle water! No deposits, no carboy returns. A capful is enough for a barrel of nickel.
Nickelite boosts corrosion resistance of barrel nickel 30 to 100% by actual salt spray test.
Plater's Research Corporation
59 EAST 4TH ST.
NEW YORK 3, N. Y.

Beautiful Effects

are achieved on household items with these new **RANDOLPH FINISHES**

An exciting profusion of brass, wrought iron and wood products are bringing decorative magic into American homes. The glints, tones and colors that are helping to make sales for many of these items are the result of a wonder-working new series of Randolph Finishes especially developed for the latest trends in home decoration.

These are among the finishes we are introducing for this new era of beauty in the home!



CLEAR LACQUER for BRASS # 8000

Excellent performance in dip or spray application. Flawless adhesion on polished surfaces.

WROUGHT IRON BLACK LACQUER

Spray or dip application. Excellent adhesion.

WOOD LACQUERS

New additions to our Wood Lacquer line are a new Water White Clear Lacquer and a High-Solid Lacquer for cold application; rubs well, good cold check performance.

Write us today and tell us your individual needs! We are specialists in the "custom-finish!"

LACQUERS
ENAMELS
DOPES
THINNERS

Randolph

PRODUCTS COMPANY

CARLSTADT, NEW JERSEY

were then delivered to a specialty plating shop in Detroit for the gold plating operation.

In the initial step for gold plating in the specialty shop, the parts were subjected to a preliminary operation called "coloring" in which they were buffed with rouge on a soft linen wheel. After being wired for the electrolytic processes to follow, the parts were immersed in a cleaner tank. The solution in the tank was specifically designed to electrolytically remove the buffing compound together with any foreign bodies which may have been present on the surface.

The nickel plated parts then went to a pickling bath of muriatic acid, and then the parts entered the plating tank where gold was electrodeposited on the properly prepared surface. The fine-grained nickel resists the alloying action of the gold deposited on the surface and results in a "pure gold" finished appearance.

Following gold plating, the parts were given a protective clear lacquer coat and shipped to Flint where they were fed into the regular assembly line for use on the 50 millionth GM automobile.

★ ★ ★

A portion of the more than 600 parts gold plated for use on General Motors' 50 millionth automobile, a golden Chevrolet.

The Tin Research Institute has developed two applications of tin as a nickel alloy: Tin (65 per cent) and nickel (35 per cent) for plating, and copper (75-82 per cent), nickel (15-20 per cent) and tin (3-5 per cent) for stamping and embossing.

A portable tin-nickel plating plant is being used to demonstrate the ease and simplicity of the process to manufacturers throughout Great Britain.

Engineered for Extra Years of Trouble-Free Operation

WALKER
Selenium Rectifiers

You can't beat Walker Selenium Rectifiers for dependable D.C. regardless of the size of your plating installation.

These outstanding rectifiers are especially designed to give year in, year out service . . . minimum maintenance . . . no moving parts . . . nothing to wear out . . . nothing to get out of adjustment.

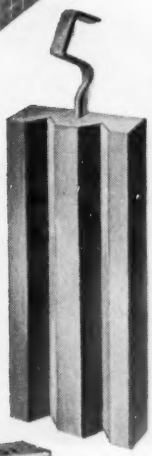
You get more for your money when you use Walker Selenium Rectifiers. Get the complete story, today. Write

The Walker Division

THE WALKER DIVISION
NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT

FILTER OUT anode metal losses!

Here's a tip on how to save anode metal: *Keep your plating bath clean.* You'll have fewer rejects . . . better finish . . . longer mileage out of every anode.



Start CLEAN . . . Stay CLEAN

. . . by using Red Label Darco® S-51 regularly. It's the activated carbon especially made for taking harmful impurities out of plating baths. It wets quickly; it's easy to make up into slurries.

Get Red Label Darco S-51 from your local supplier. He has it in convenient 10-lb. and 50-lb. cartons. Be sure to ask for it by name!

Write for a copy of the article "Filter Out Your Plating Rejects", by Ezra A. Blount

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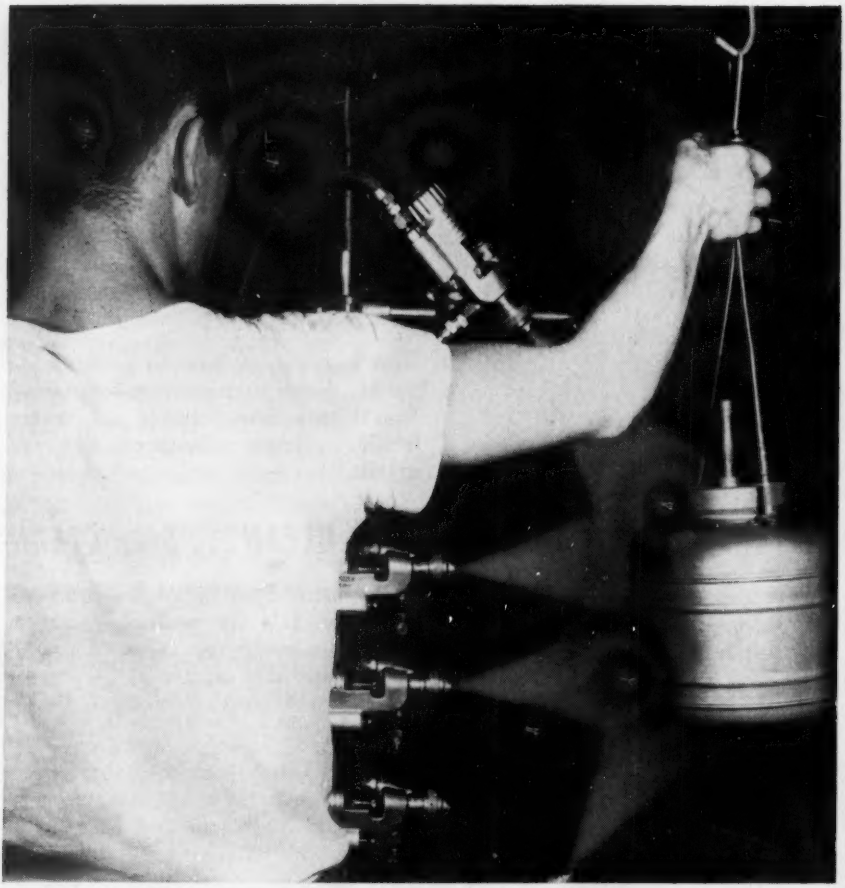
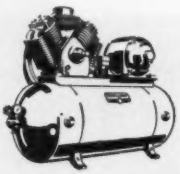


DeVilbiss semi-automatic spray equipment saves paint, gives better finishes to Royal thermic jugs, at Royal Manufacturing Company, Bowling Green, Ohio.

Spray Guns

Air Compressors



Hose and Hose Connections

BRANCH OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT

Royal goes automatic to save paint . . . get better finishes

DeVilbiss Automatic Spray Guns provide foolproof finishing for thermic jug manufacturer . . . give uniform finishes, increase paint mileage, lower operating costs, step up production by cutting rejects.

The Royal Manufacturing Co., Bowling Green, Ohio, had a problem. Their Royal thermic jugs required a high-quality hammered finish of synthetic enamel, yet manual spraying allowed too many variables in the delicate operation for their quality standards.

Royal solved its problem by installing DeVilbiss Automatic Spray Guns in a semi-automatic set-up. The film thickness applied, the wetness of coat, the degree of atomization — all are precisely controlled. Result: uniform hammered finishes of long-lasting beauty.

Furthermore, the speed and precision of the new DeVilbiss semi-automatic system have enabled Royal to step up production, increase paint mileage (from 650 to 1,100 jugs), reduce operator fatigue and rejects.

Says Royal's president, D. W. Bolton, "DeVilbiss semi-automatic equipment gives us a foolproof finishing set-up." Royal now uses DeVilbiss throughout its finishing department: spray guns, air compressor, spray booth, transformer, hose and hose cleaner.

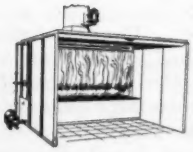
Could you speed output and get better finishes at lower cost with DeVilbiss semi-automatic equipment in *your* paint department? Let a skilled DeVilbiss engineer survey your finishing operation and give you a full report. For complete information, contact your local DeVilbiss jobber or branch office, or write us direct for free literature.

THE DEVILBISS COMPANY

Toledo, Ohio

Santa Clara, California • Barrie, Ontario • London, England

Spray Booths



FOR BETTER SERVICE, BUY

DEVILBISS

THE UNITED STATES, CANADA AND THE WORLD

FINISHING

Question: *We are users of a large quantity of zinc die castings which are copper, nickel and chromium plated according to standard specifications. We have been informed that a low temperature bake of the castings prior to plating will lower the incidence of plating pits and similar failures. Have you published any material concerning this process of which reprints are available, or can you provide any information on it?* *M.E.K.*

Answer: Baking techniques have been employed in the case of magnesium castings and iron castings, sometimes in connection with vacuum impregnation. Usually, however, the quality of zinc die castings is such that the castings may be plated with little or no difficulty. You may be able to obtain additional information from your zinc supplier or from representatives of companies from whom your plating materials are purchased.

——— fc ———

Question: *We manufacture parts on which it is desirable to have a bright brass or copper finish on steel. Some of the parts are quite intricate in shape and it is impractical to polish them. We have had difficulty in finding a source or product with which we can brighten the steel chemically prior to plating so that polishing is not required. Can you offer any suggestions?* *O.S.L.*

Answer: Chemical polishing of aluminum and brass has been accomplished, as well as chemical polishing of steel. We are referring you to sources of information on chemical polishing methods.

You might like to consider the possibility of polishing your parts mechanically in tumbling barrels, and for information concerning that process and equipment necessary, we are referring you to a number of suppliers.

Special solutions for bright brass and bright copper plating are sold by several plating supply companies.

——— fc ———

Question. *The article, "Finishing Metal Surfaces for Aircraft Gas Turbines," which was published in the August, 1954 issue of PRODUCTS FINISHING, poses several questions. May we have the answers to the questions outlined at your convenience?* *B. P. C.*

Answer. The current density at which anodizing is done varies. Parts are subjected to treatment initially at 37 asf in the large chromic acid anodizing tank. However, after 2 minutes, the current density has dropped to 14 asf, and at the end of the 10-minute cycle, it has reached a value of 1.6

CLINIC

amperes per square foot.

Aluminum alloys processed include 355, 14S, 52S, and 61S.

Chromic acid anodizing is used for these products because of specification requirements, and for the further reason that chromic acid, which remains in crevices or holes after the parts leave the tank is not harmful to the part in question.

The thickness of the anodized coating is measured in terms of weight, and consists of 1.33 mg./sq. inch.

——— *fc* ———

Question: *From time to time we require small quantity plating in nickel, silver and gold. We would like to set up an experimental bath for doing this type of plating, using beakers and wet cell batteries.*

Would it be possible for you to send us information as to the type of electrolyte necessary, together with currents and voltages for plating with the abovementioned materials? We might add that the parts that we would plate would be very small in size.

A.J.B.

Answer: From "Principles of Electroplating and Electoforming" by Blum and Hogaboom, the following formulas may be listed.

Nickel—

Nickel sulfate	32 oz./gal.
Nickel chloride	6 oz./gal.
Boric acid	4 oz./gal.
pH 4.5 to 5.5	
Temperature	110 deg. F.
Current density, 20 to 65 amp./sq. ft.	

Nickel sulfate	16 oz./gal.
Ammonium chloride	2 oz./gal.
Boric acid	2 oz./gal.
pH 5.3	
Room temperature	
Current density, 5 to 20 amp./ sq. ft.	
For either bath a source of current at 6 volts or more is desirable.	

Silver—

Silver cyanide	4.8 oz. /gal.
Potassium cyanide	8 oz./gal.
(Free potassium) cyanide	5.6 oz./gal.
Temperature	80 deg. F.
Potassium carbonate	6.0 oz./gal.
Current density	5 to 15 amp./sq. ft.
Voltage	2 to 3 volts

Gold—

Metallic gold (as cyanide)	0.25 oz./gal. (troy)
Potassium cyanide	2 oz./gal.
Sodium phosphate	0.5 oz./gal.
Temperature	160 deg. F.
Current density	5 amp./sq. ft.
Voltage	2 to 3 volts

If the parts which you desire to plate can be handled in sufficient quantity, you might find it advantageous to use barrel plating equipment. For information relative to barrel plating equipment, and also for information regarding the plating solutions, we are referring you to a number of suppliers.

DO YOU HAVE A FINISHING PROBLEM?

The editorial staff of PRODUCTS FINISHING is prepared to aid you in the solution of your problem.
There is no charge for this service.

Spotlighting FINISHING Progress

Porcelain Enamel

THE manufacture and applications of porcelain enamel, especially in the field of household appliances, have been described in a recent paper by Wilbur H. Pfeiffer of the Frigidaire Division, General Motors Corporation. Because of the interest of metal finishers in this subject, Mr. Pfeiffer has kindly permitted the following extensive reporting of his paper.

Identification of Porcelain Enamel

Porcelain enamel is a glass coating on metal. Porcelain enamel has also been called *vitreous enamel*, an excellent descriptive term since *vitreous* is synonomous with *glassy* (this substance is a true glass), while *enamel* indicates a glossy coating on a base metal. The more modern term *porcelain enamel* is also descriptive, signifying an enamel similar to true *porcelain*. True *porcelain* is a very fine earthenware which is so glassy that it appears glazed. Also commonly but erroneously referred to as *porcelain* is the glazed earthenware material used in plumbing ware and in some types of wall tile. Earthenware is not a completely vitrified material

By Dr. C. Fred Gurnham,
Head, Dept. of Chemical Engineering,
Michigan State College

•

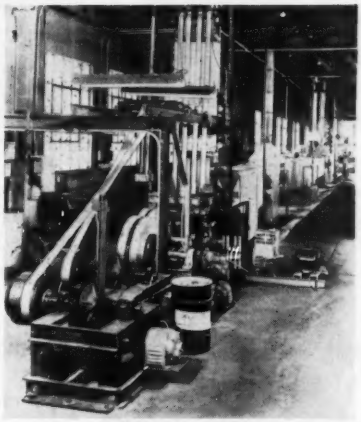
A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

Arrow METAL PRODUCTS— CORP.

PRE-COATED ALUMINUM COILS ARE *Alodized*

WITH ALODINE®

FOR EXTRA PROTECTION



COLOR FUSED—

Ready for End-Product Assembly
Saves Labor—Time—Capital Investment

Arrow Metal Products Corp. of Haskell, N.J. is the largest producer of pre-coated, color fused aluminum coil. Alodizing with "Alodine" has made possible its beautiful, durable, baked enamel finish, as well as its "Porcenamel" thermo-set plastic finish for aluminum coil, and pressed and formed aluminum parts.

Many prominent manufacturers rely on Arrow for quality pre-coated aluminum coils, ready for assembly into their finished products.

If it's aluminum, be sure it's Alodized.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

CHEMICALS ACP PROCESSES

General Offices: Ambler, Penna.

CHEMICALS ACP PROCESSES

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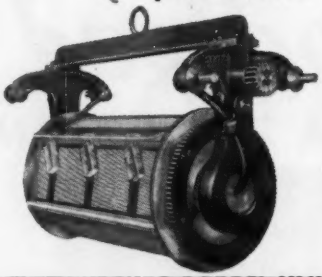
for ★ Production ★ Highest possible current ★ Heavy duty performance



STUTZ PLATING BARREL UNIT

of High Temperature Lucite for continuous operation through Alkali Cleaning, Acid Pickling, Acid and Alkaline Plating solutions and rinsing. Largest number of cylinder perforations possible. Our new patented method of dual hole design provides extra small holes previously unobtainable.

STUTZ PLATING BARREL UNIT

Motor Drive Mounted Overhead

Continuous rotation of cylinder from one operation to another, and where a minimum of solution dragout is important. Roller bearing chain drive to absorb load shock.

Write for illustrated literature on our new Portable Plating Barrel.

Manufactured by

GEORGE A. STUTZ MFG. CO.

1647 Carroll Ave., Chicago 12, Ill.

like porcelain. During its manufacture only a portion of the ingredients fuse to a glassy structure, while the remainder persist as discrete particles bonded together by the glass. Completely vitrified ceramics are transparent or translucent, and include glass, chinaware, porcelain, and porcelain or vitreous enamels.

Porcelain enamel is a vitrified ceramic applied as coating to a metal, and fused to the metal at a moderate red heat. This application of enamels to metals was known to the ancients; gold, silver, and copper enamelware objects were made by the ancient Egyptian, Greek, and Byzantine nations. Modern commercial enameling on iron started about 1830 in Czechoslovakia; in the United States, the industry dates back to 1867.

Present-day applications of porcelain enamel include many household appliances, especially for the kitchen and bathroom, such as kitchen range panels and oven linings, refrigerator linings, sinks, washtubs, bathtubs, and table tops. Outside the home there are numerous uses of porcelain enamel, for example, in store fronts, gasoline pumps, and advertising signs.

Development of Modern Porcelain Enameling

The older method of application of porcelain enamel to iron was the so-called "dry" process. In this technique, the cast iron sheet or object is heated to redness in a furnace, then withdrawn and dusted with the powdered glass. Partial fusion and bonding occur at this stage, and the ob-

WYANDOTTE ANNOUNCES

a superior electrocleaner for nonferrous metals in automatics or hand lines

Laboratory and production tests prove that Wyandotte's new electrocleaner, LECTRITE-NF, improves results, cuts costs! It does an outstanding job on nonferrous metals, especially brass, and provides the following advantages:

INHIBITED to prevent etching, staining, excessive oxidation, clouded plate — during cleaning as well as in long transfers.

VERSATILE—New LECTRITE-NF is effective in hard or soft water, on brass, copper, copper alloys, zinc-base diecastings, and other special alloys. For single-tank reverse-current electrocleaning, or where two-stage direct and reverse cleaning is employed.

BALANCED for fast and complete wetting, free rinsing, controlled foam blanket which assures uniform, more efficient processing. Mail coupon today! *Wyandotte Chemicals, Wyandotte, Mich. Also Los Nietos, Calif.*

FORTIFIED for exceptionally high detergency, soil tolerance and long use-life which insures lower use-cost for you.

MAIL NOW FOR DATA AND DEMONSTRATION

Wyandotte Chemicals Corporation,
Dept. 2300
Wyandotte, Michigan

☐ Send more data on the use of new LECTRITE-NF.

☐ Have representative call.

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ject is then returned to the furnace for completion of vitrification. The dry process has been used for many purposes, including the manufacture of cooking utensils, bathtubs, lavatories, and sinks.

The "wet" process of porcelain enamel application is about a century old, and at present has largely replaced the older dry process. In this method the powdered glass is suspended in a water-clay slurry, and applied to the metal by dipping, pouring, or spraying. The wet coating is dried, then fused in a furnace. Various "tricks of the trade" have been employed to obtain firm bonding of the enamel to the base part: one method used for many years produced a mottled effect, known as granite or agate ware. More recently, cobalt oxide has been added to the glass to promote adherence. This gives an intense blue color, which can be concealed if necessary by an enamel cover coat.

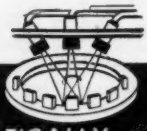
A recent development is the commercial application of porcelain enamel finishes to aluminum. This is done by a wet process technique. The principal uses are for architectural and industrial purposes.

Appliance Finishes

Sheet metal parts of household appliances

which of these CLEANING PROBLEMS are yours?

- ☐ Insulating coatings
- ☐ Amorphous metal
- ☐ Discoloration
- ☐ Lacquer
- ☐ Plastic flash
- ☐ Rubber flash
- ☐ Glass flash
- ☐ Enamel flash
- ☐ Imbedded metal
- ☐ Lead deposits
- ☐ Carbon
- ☐ Brazing flux
- ☐ Weld spatter
- ☐ Stains
- ☐ Heat treat-scale
- ☐ Radio-active oxides
- ☐ Dirt
- ☐ Grease
- ☐ Oil
- ☐ Rust
- ☐ Varnish
- ☐ Paint
- ☐ Plate
- ☐ Core sand
- ☐ Silicate coatings
- ☐ Excess solder
- ☐ Ceramic deposits
- ☐ Graphite
- ☐ Slag
- ☐ Polishing compound



DO IT MANUALLY OR AUTOMATICALLY WITH PRESSURE BLAST WET BLASTING

TWO SPEED

This ad is your coupon. Check off your problem (s) and mail today for free illustrated literature . . . Application data . . . case history information!

THE CRO-PLATE COMPANY INC.

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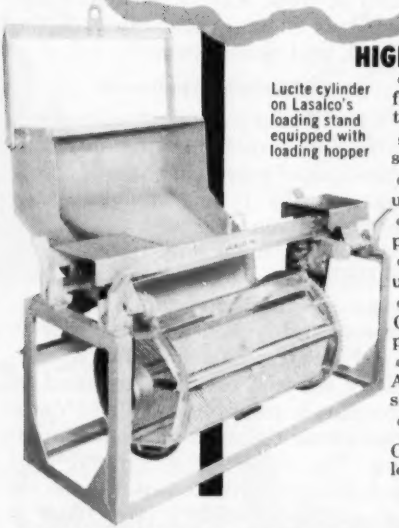
Does The Complete Plating Job In A Single Cylinder!



Lucite cylinder on Lasalco's loading stand equipped with loading hopper

HIGH TEMPERATURE LUCITE CYLINDER

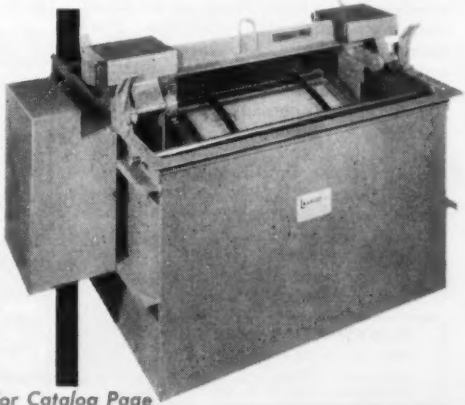
- Eliminates work transfers—carries the work from start to finish—speeds up plating operations—lowers production and equipment costs
- Remains impervious to all usual plating solutions
- Lasts indefinitely when used in temperatures up to 170°
- Full length 1-piece negative connection gives perfect contact. Heavy dangler imbedded in load
- Negative contact can be arranged to carry up to 800 amps.
- Quick, unobstructed loading and unloading. One-piece door has instantly removable positive-locking clamps
- Rugged construction of ½" thick Lucite. Annealing after assembly prevents all internal stress
- Capacity up to 150 pounds

Cylinders available in 24", 30", 36" and 42" lengths. Inside diameters 12" or 14" across flats.

RICHARDS BARREL PLATER

with LUCITE CYLINDER

- Knife switch contacts are entirely self-cleaning when cylinder is lowered into place.
- Cylinder knife switches insulated and protected by guard from overhead drippage.
- Multiple units for tackle hoist operation. Single units either tackle or hand hoist.
- Motor-driven gear drive has 3-speed selector for 2-4 and 6 r.p.m.
- Nothing plates but the load! A real money-maker that does a better job in less time at lower cost.



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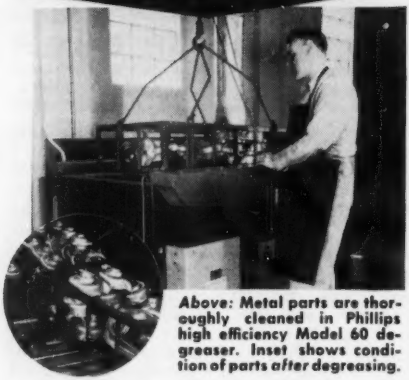
POWER TOOL MANUFACTURER CLEANS CASTINGS, STAMPINGS, MACHINED PARTS, FASTER AND MORE THOROUGHLY WITH A PHILLIPS DEGREASER



Above: Metal parts are thoroughly cleaned in Phillips high efficiency Model 60 degreaser. Inset shows condition of parts *after* degreasing.

HERE is another case illustrating the high cleaning efficiency of Phillips degreasers. Skil Corp., Chicago, uses a Phillips Model 60 electric batch-type machine to clean aluminum and iron castings, steel stampings, shafts and screw machine parts. These parts are thoroughly cleaned before painting and assembly. Among the types of soil removed are coolants, kerosene, drawing oils, and plain shop dirt.

Skil reports that the Phillips unit cleans their parts 3 to 4 times faster than their former method. Production is speeded up and better quality control is assured.

Our representative will be glad to discuss your problem with you.

SEND FOR YOUR COPY OF THIS NEW BULLETIN—Describes and illustrates Phillips engineered metal cleaning equipment.

Phillips MANUFACTURING COMPANY

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In Canada: Mfd. by Williams Tool Corp., Brantford, Ont.

must be coated to protect them from corrosion and to provide an attractive appearance. The common coating materials are porcelain enamels and baked paint enamels; each of these has its particular advantages in cost, protection of the metal, and permanence.

Household Appliances

Mr. Pfeiffer's paper discusses the principal household appliance applications of porcelain enamel, pointing out why it has advantages in each particular use.

Kitchen ranges have utilized porcelain finishes for many years, because of their resistance to heat, grease, and spilled foods, as well as for their attractive appearance. Specially selected enamels are used in top panels to provide the best resistance to acids, abrasion, and scratching. The cobalt blue ground coat provides a satisfactory finish for oven linings, while a cover coat is applied to exterior surfaces to obtain whiteness or other color and gloss.

Refrigerator linings and interior pans are generally finished with porcelain enamel. This material is satisfactory under conditions of alternate freezing and thawing, high humidity, and abrasion by objects stored in the refrigerator. Special porcelain enamel formulations are used to resist ice damage and corrosion by food acids.

Washing machines and other home laundry appliances are usually porcelain-enameled, using enamels with high resistance to detergents and alkalies. Smooth surfaces

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and moisture resistance are important factors in this type of equipment. Exterior surfaces of dryer cabinets are sometimes paint-enameled; moisture resistance may, however, be inadequate, especially in basement locations.

Water-heater tanks have been made of galvanized steel for many years. Because of the corrosive action of some waters, especially at elevated temperatures and under pressure, there is a trend toward the use of porcelain enamel (glass-lined) tanks for this application.

Preparation of Base Metal for Enameling

The wet process is almost universally employed at the present time for porcelain enameling sheet steel parts for household appliances. Various grades of steel are used, usually ranging from 24 to 17 gauge (24 to 54 mils). The enameling iron is specially processed at the steel mill for these uses. This is a high purity iron containing 0.01 to 0.04 per cent carbon and not over 0.1 per cent manganese plus a minimum of residuals. These sheets have uniformly good strength at high temperatures, cause a minimum of enamel defects, and have a surface texture particularly adapted to application and good bonding of the enamel.

Low-carbon steel sheets (0.05 to 0.08 per cent carbon, 0.25 to 0.50 per cent manganese plus residuals), as used for automobile bodies, are sometimes porcelain-enamel finished. This is a low cost base metal, but its internal and surface conditions cause frequent defects in the enamel coating. Steel parts can be welded and otherwise assembled and fabricated, then cleaned by sand blasting and special chemical treatments to remove contaminants, rust, and welding scale before enameling.

Preparation of the Frit

The enamel material or frit is a glass of special characteristics for application as enamel and for special requirements of the particular use intended. There are many types of glass composition, all of which are trade secrets of the various manufacturers. Acidic refractory materials like quartz, feldspar, and clay, together with basic flux materials such as borax, soda ash, cryolite, and feldspar, comprise a major part of the mix. Opacifiers and colors are commonly added; the blue

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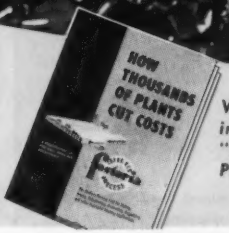

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color of cobalt is incidental to its adhesion benefits, and can be obscured, if desired, by other pigments in cover coat enamels. The zirconium and titanium type enamels differ from the above composition, but little information on these specialties has been published; the titanium type is widely used for household appliances.

The principal requirement of a porcelain enamel is that it form a smooth continuous coating firmly bonded to the base metal. In most commercial formulations, this requirement is aided by incorporation of compounds of cobalt, nickel and manganese in the mix. These elements produce a dark bluish color. Good fluidity of the enamel in the fused state is essential to permit release of gases without loss of coating continuity. Cover-coat enamels have less stringent requirements for fluidity and adhesion, hence a wider range of composition is possible, and special purpose enamels can be developed as well as a wide range of colors including white.

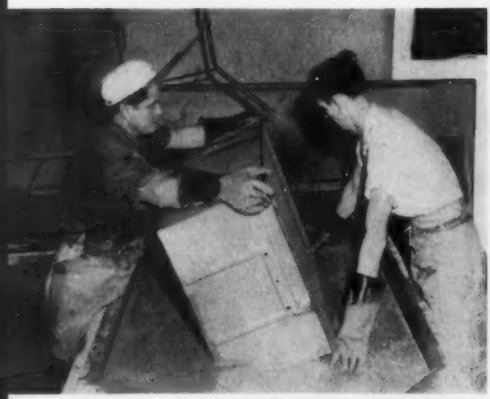

Fig. 1—Applying ground coat enamel to a refrigerator liner by dipping.

Application of Enamel

In preparation for enameling, the frit is mixed with water, small amounts of clay, and chemicals that aid in keeping the enamel in suspension. The wet mix is then ground in a ball mill until most of the particles will pass a 200-mesh screen.

Usually the ground coat of enamel is applied to both sides of the sheet or object, while the cover coat is generally on one side only. The ground coat can be applied, therefore, by dipping, and the cover coat by spraying. There are exceptions to this general rule: parts not well shaped for dipping may be spray-coated entirely; cover coats that cover all sides of the object such as refrigerator vegetable pans, may be dipped. The wet coatings are then dried in a conveyorized oven.

Firing or fusing of the enamel is performed in an air-atmosphere furnace, usually on a monorail conveyor. The hot zone of the furnace is at about 1500 deg. F., and parts are subjected to that temperature for 3 or 4 minutes. Cover-coat firings call for slightly lower temperatures and briefer exposure.

The chemical and physical changes that occur during firing have been listed by Mr. Pfeiffer as follows:

1. The metal surface oxidizes as the parts are heated.
2. The clay and some of the chemicals dehydrate.
3. The metal and the glass give off gases.

What you should know about *Phosphate Coating*

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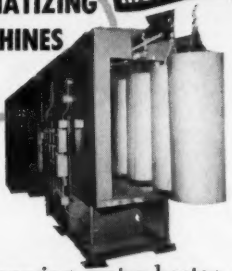
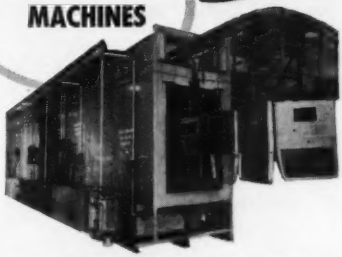


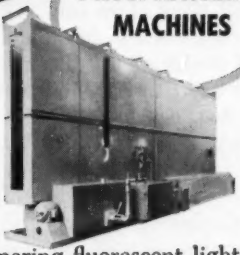
Preparing water heater shells for enameling

metalwash PHOSPHATIZING MACHINES



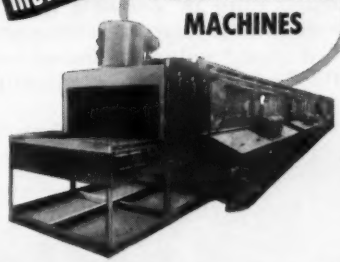
Preparing truck parts for painting

metalwash PHOSPHATIZING MACHINES

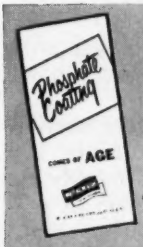


Preparing fluorescent light fixtures for enameling

metalwash PHOSPHATIZING MACHINES



Preparing hardware parts for painting



Phosphate Coating COMES OF AGE

A review of the types of phosphate coating specified by industry for metal surfaces

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4. Hydrogen is absorbed by the metal.
5. The melted glass dissolves the iron oxide, the clay, and the chemicals.
6. The melted glass wets the metal.
7. The dissolved iron oxide and the bubbles migrate through the molten enamel.
8. Stresses in the metal are relieved and the metal distorts because of differential heating and pull of gravity.

During firing, it is essential that the entire metal-enamel system reach an adequate temperature and hold it long enough to ensure proper progress of the reactions. Too high a temperature or too long a time, however, cause excess reactions with loss of glassy nature of the enamel and deterioration of the metal-to-enamel bond. Low melting temperature range of the frit is desirable, to avoid major metal distortions which occur at temperatures above about 1500 deg. F.

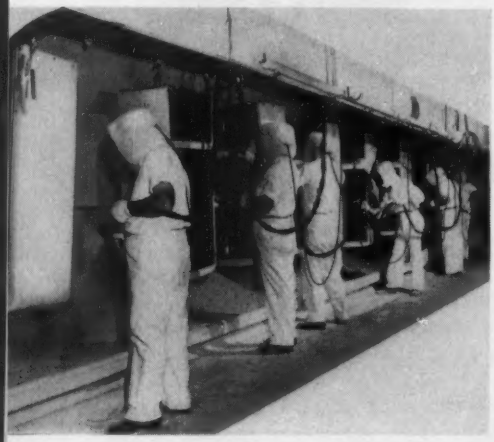


Fig. 2—Applying white cover coat enamel to refrigerator cabinets by spraying.

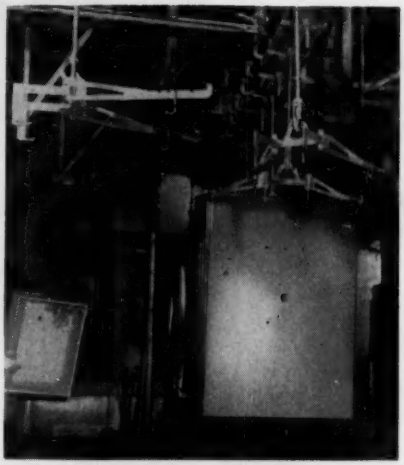
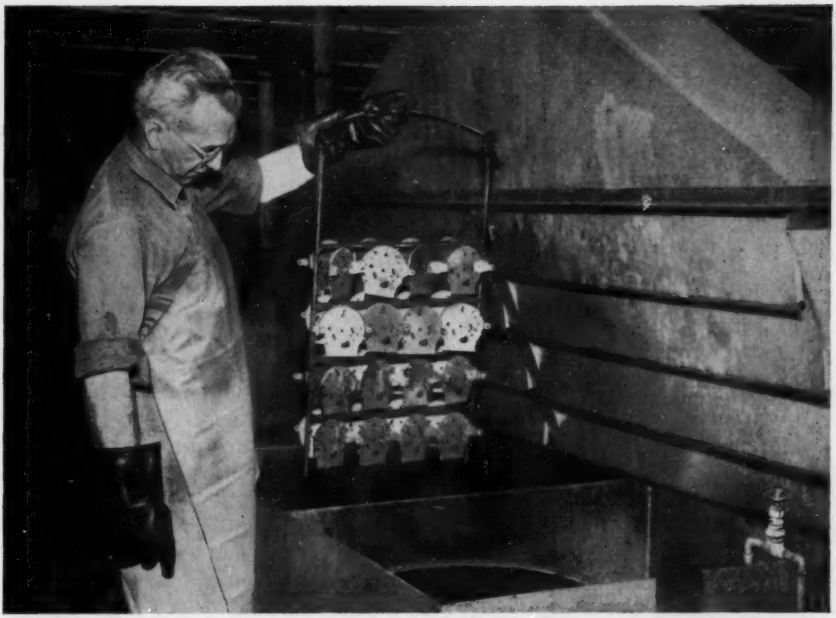


Fig. 3—Refrigerator liners hanging from firing fixtures enter (left) and leave (right) u-type furnace (background) where the ground coat enamel is fused to the metal liner.

During the cooling phase, the glass reabsorbs gases, and solidifies. Stresses and strains develop because of differential cooling and differential contraction of metal and enamel. Hydrogen is released from the metal, often over a period of several weeks. If the enamel-to-metal bond is not strong enough, hydrogen pressure causes fracture defects known as fish-scales.

Cover coat firing is a less complex process than ground coat firing. The two coats fuse together readily, so adherence is not a problem. A reasonable fluidity is desirable to permit escape of gases and vapors from the ground coat. This may be a problem,



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This plant, manufacturing electric meters, formerly used hydrochloric acid for descaling annealed steel parts. Today they have switched to Pennsalt's new PM-90, and report "it gives better descaling and a superior quality finish at no extra cost."

Their cleaning cycle: Degrease . . . alkali clean . . . cold rinse . . . pickle in PM-90 . . . rinse. Parts range in size from very small to quite large and after cleaning are plated with cadmium, or copper and nickel.

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since non-fused opacifiers like titanium compounds restrict the degree of fluidity. Time and temperature must be adequate for fusion of clay and other chemicals, escape of gases, development of a smooth surface, and proper crystallization or conditioning of opacifiers and coloring ingredients. Excessive time or temperature may cause activity in the ground coat, bleeding of ground coat colors into the color coat, or precipitation of opacifiers in unsatisfactory physical form.

All glasses are much stronger in compression than in tension.* It is desirable, consequently, to select frit constituents so the enamel contracts less than the metal during cooling, thus leaving the enamel in a state of compression. Any strain imposed later either increases the compression or relieves it, but does not cause tension failure unless the strain is great.

Fracture of enamels in service is usually associated with permanent deformation of the base metal, so heavier gauge metal provides increased resistance to damage. The thickness of enamel also affects the susceptibility to damage, although not in so simple a manner. Impact failure is initiated by tension within the glass adjacent to the metal surface; hence, thicker coatings increase the resistance to impact damage. On the other hand, in bending or torsion, the failure is initiated at the outer surface of the enamel; thin coatings

*See PRODUCTS FINISHING, Oct., 1954, page 58.

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are most resistant to such damage. Since appliance parts are subjected more to bending and torsion than to impact, thin coatings are preferred.

Ground coat thicknesses vary from 2½ to 6 mils, and are generally in the range of 3 to 4½ mils. Products of good light reflectance properties can be obtained with cover coats from 2½ to 5 mils in thickness.

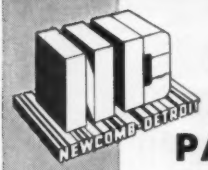
THE porcelain enamel industry has made major progress during the past 25 years. The minimum thickness of white enamel coatings used to be as great as 14 mils in order to obtain satisfactory appearance. Resistance to chemical attack was poor, only small parts could be enameled, and defects were common.

The modern porcelain enamel industry is capable of processing large assembled structures such as refrigerators, with few interruptions of production. Total thicknesses can be as little as 6 mils for satisfactory white parts. Chemical resistance is a matter of choice and can be provided for almost any type of corrosive materials.

The major objection to procelain enamel finishes is that they are subject to fracture damage by abuse. The wide use of such finishes indicates that this is not an unreasonable hazard. Beauty, resistance to corrosion, ease of cleaning, and permanence are important factors in maintaining the present popularity of these finishes.

NEWCOMB-DETROIT

PIONEERS IN ENGINEERING, MANUFACTURE AND INSTALLATION OF



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A New Control Method for Electrodeposited Alloys

THE first association the writer of this column had with electrochemistry was the task of building and operating a continuous wire plating installation for brass electrodeposition. It did not take him long to discover that the composition of alloy deposits is subject to variations from many different factors. In fact, after some experimentation, it was possible to select certain of these factors as controllable variables, used to overcome the adverse effects of other less controllable and often unidentified variables. The operating instructions developed are, in retrospect, truly wonderful to behold, including bath additions of sodium cyanide, sodium-copper cyanide, sodium-zinc cyanide, copper cyanide alone, or water; pH adjustment, up or down; temperature variations; voltage and current changes; current density; and wire speed. Among the uncontrollable variations were number of wires plated, diameter of wires, and unknown factors.

The installation referred to above operated successfully a reasonable portion of the time, although many improvements were made both while the writer was in charge, and since. The experience developed a lasting interest in alloy plating and methods for control of alloy composition. A paper presented at the Fourth International Conference on Electrodeposition and Metal Finishing, held in London during 1954, describes a new

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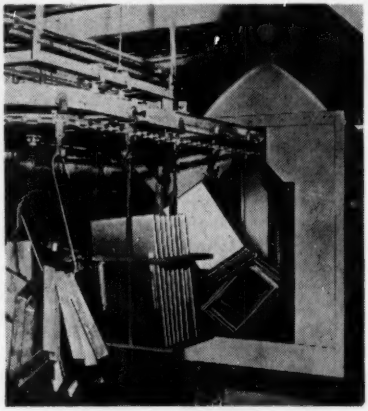

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operating and control method that seems particularly interesting. The article you are now reading is an abstract of the paper, "The Electrodeposition of Gold and other Alloys by a New Method," by G. E. Gardam and N. E. Tidswell, based on work done at the Design and Research Centre for the Gold, Silver, and Jewellery Industries.

It is pointed out by Gardam and Tidswell that electrodeposition of alloys or metal mixtures is usually accomplished with a solution containing both metals in the form of compounds from which the deposition potentials are equal or nearly equal. Simple ionic salts of the metals are not usually satisfactory, but it is necessary to utilize complex ions of one or both metals. Cyanide complexes are common in many alloy plating solutions, including brass and precious metal alloys.

ALLOY composition can be controlled by varying the solution composition, although Gardam and Tidswell emphasize the well-known fact that the critical solution composition is that adjacent to the cathode surface, not the gross composition of the entire bath. These two compositions may be quite different, since the film of solution in contact with the work is more or less depleted of its metal ions, to a degree governed by film thickness, rate of deposition, and rate of diffusion. Each of these factors in turn is dependent on several other variables, so the relationship between film and bath compositions is practically unpredictable.

REPRINTS AVAILABLE

A limited number of reprints of the following articles from PRODUCTS FINISHING are available to readers without charge.

"Bright Nickel Process Simplifies Bumper Manufacture,"
by Robert D. Miller.

"Chemical Surface Treatment Extends the Durability of KoolVent All-Weather Aluminum Awnings,"
by Norman P. Gentieu, American Chemical Paint Company, Ambler, Pa.

"Electroless Plating in Production,"
by Thomas A. Dickinson.

"Effect of Plating Thickness on Screw Thread Dimensions."

"Finishing Floor Registers and Grilles at The Auer Register Company,"
by Ezra A. Blount, Editor.

"Finishing Refrigerators with Hot Sprayed Enamel,"
by Frank L. Bonem.

"Flow Coating Range and Heater Parts,"
by Ezra A. Blount, Editor.

"Hard Chrome Plating Made Easy,"
by Ezra A. Blount, Editor.

"Hot Spray Finishing of Machine Tools,"
by Roy W. Hill, Besly-Welles Corporation.

"How to Finish Metal Products by Vacuum Metallizing,"
by J. Gordon Seiter.

"Hub Caps Plated and Enameled in Conveyorized Setup"

"PRODUCTS FINISHING Article Index, 1954."

"How the Paint Warmer Aids Finish Application and Quality,"
by Lee Turner.

"Tips on Buffing Aluminum Castings"

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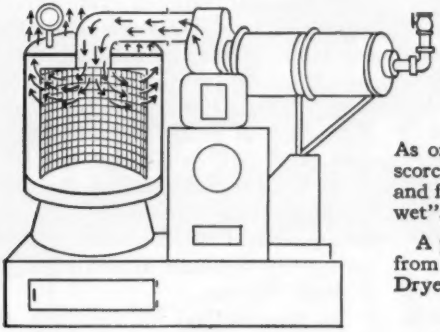

If you did, you saw a practical demonstration of the principle of air deflection. In old type dryers, air *blown* in from the top is deflected by the top layer of parts. As one user put it, "the top layer gets scorched, the next layer is nice and dry, and from there on down the parts are still wet".

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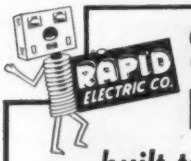
Side reactions that occur at or near the cathode surface also affect the relation between film and bath composition. Particularly in cyanide solutions, oxidations and carbonations are important. Then, too, since the metal ratio in the electrodeposit is rarely identical with that of the solution, electrodeposition itself causes change in liquid film composition.

The inevitable presence of a relatively stagnant liquid film adjacent to the cathode thus complicates the electrodeposition process, particularly with respect to alloys. In the new technique, discussed by Gardam and Tidswell, however, this film is made to serve a useful purpose in aiding control of the deposits. This is accomplished by controlling the depositing current in the manner described below.

In the new method of alloy deposition control, the deposition potentials of the two metals must be different though not greatly different. Conventional complex cyanide solutions can be employed, and the formulation is less critical than usual. In a thoroughly mixed solution, the steady current would deposit only the metal of more positive deposition potential, or perhaps an alloy containing but a trace of the other metal. Because "thorough" agitation is a practical impossibility, a comparatively stagnant film exists at the cathode surface.

In the method of Gardam and Tidswell, the current density is established at a value that depletes



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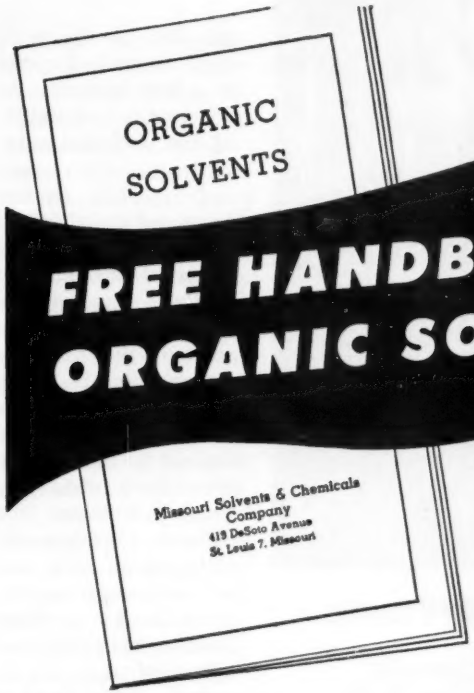

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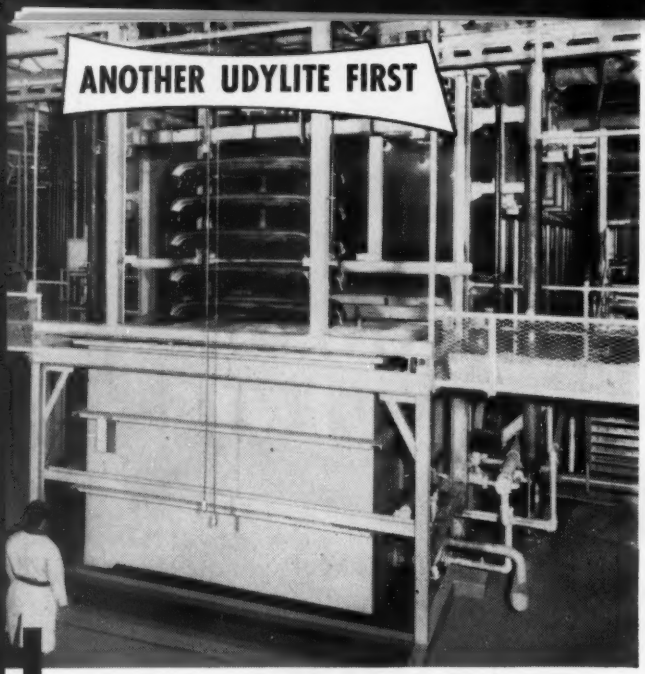

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this film of the more easily deposited metal in a few seconds. As this metal is exhausted, the potential automatically increases and the less readily deposited metal is laid down. If the applied potential and current continue beyond this point, hydrogen is deposited, the film becomes alkaline, basic compounds may be precipitated, and the deposit is "burnt." Before this stage is reached, however, the current is automatically cut off by a preset contactor for a predetermined period. Normal mixing and diffusion then act to restore the original film composition, identical with or closely approaching the bulk of the solution. The current is then automatically turned on for another cycle. The final result is deposition of alternate layers of the two metals, in such thin layers that the effect is equivalent to alloy deposition.

The duration and ratio of "on" and "off" periods can be varied, mechanically

or electrically, to produce any desired deposit composition, without changing the main solution composition. Periods of 0.2 to 5.0 seconds were used in the experimental work reported. A small current can be maintained during the "off" period if undesirable laminations are feared. On the other hand, improved brilliance of gold alloy deposits was achieved by short-circuiting the work through a controlled resistance during the off period.

Experimental results from brass and from gold alloy solutions are described in the original paper. A 3½ second cycle time was used, and the current-flowing time was from 15 to 50 per cent of the cycle. Large changes in alloy composition, as evidenced by color, were accomplished by this variation alone. The authors point out that their research investigation is far from complete, but they have described the process so that others may investigate it.

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Nickel production by the free world in 1954 will reach an all-time high estimated at 390,000,000 pounds, or approximately 50 per cent higher than the pre-Korean 1949 output, Dr. John F. Thompson, chairman of the board of directors of The International Nickel Company of Canada, Limited, stated in a review of the nickel industry. The 1954 production is 50,000,000 pounds higher than the free world output in 1953.

Dr. Thompson said, "Although the nickel-plating industry received more nickel in 1954 than in 1953, supplies available for the industry continued to fall short of the demand. This was primarily due to the need for heavier nickel deposits to ensure quality electroplated products. A new process involving the chemical deposition of nickel to produce a uniform deposit over complex sections is supplementing the use of electrodeposited coatings for the protection of fabricated parts difficult to plate electrolytically. Extensive plating installations established for the processing of large atomic energy equipment are expected to become more widely applied for commercial use. These developments should considerably enlarge the scope of plated products."

In conclusion Dr. Thompson said: "Based on available information it is estimated that free world nickel production in 1955 should approximate 415,000,000 pounds. It is expected, after satisfying defense requirements and deliveries to government stockpiles under present schedules, more nickel will be available to free world industry for civilian applications in 1955 than was the case in 1954."

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For further information on any product mentioned in this issue— use the READER SERVICE CARDS between the covers.

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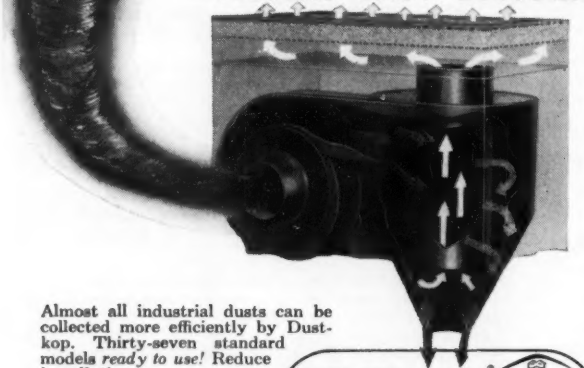

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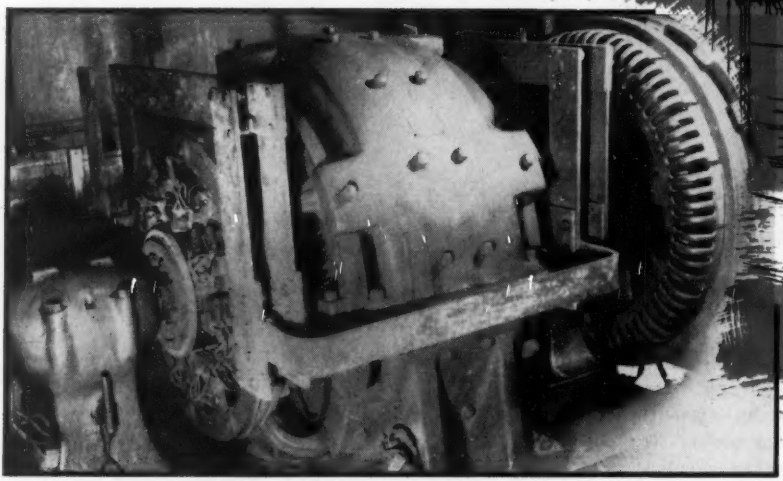

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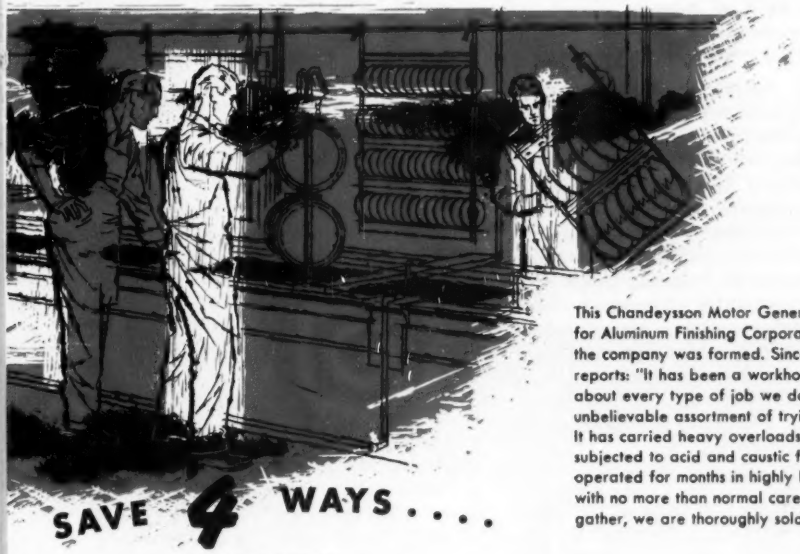

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Practical Applications of modern products

High Production and Safety Planned Into Sheet Metal Finishing System

By A. G. Trivison
Manager, Industrial Oven Division
W. W. Sly Manufacturing Company

THE newly completed plant of the Interior Steel Equipment Co., Cleveland, Ohio, manufacturer of steel lockers, cabinets, and other sheet metal products, features a finishing system engineered to ensure high productivity, minimum handling, economical utilization of fuel and heated air, a wide range of temperature and baking times with cycles consequently having a wide range of usefulness, and utmost safety. To achieve these aims, company engineers cooperated with engineers from the Industrial Oven Division of the W. W. Sly Mfg. Company in designing the finishing equipment.

Process Outline

The entire second floor of the plant is devoted to finishing operations. Parts move through a conveyorized system employing a two-stage washer, dip tanks for painting, and a baking oven (Fig. 1). Loading of the sheet metal parts is done at a station on the first floor, directly following the shear and brake operations. The sequence of operations is as follows:

1. Load.
2. Alkali wash and rinse.
3. Dry.
4. Cool (6 minutes).
5. Dip in paint.
6. Drain (12 minutes).
7. Bake (15 minutes at 320 deg. F.).
8. Cool (10 minutes).
9. Unload.

An auxiliary loading station, located on the second floor, is used to load parts which have been sprayed, prior to baking.

Conveyor

Due to the nature of the work, it was concluded that the parts should be handled as individual items, and supported in such a manner that thorough draining would be accomplished in both the washing unit and dipping operation. This was done by supporting the pieces from the conveyor by short and long work hooks.

After the method of hanging the work was determined, it was decided to carry the work on a crossbar type conveyor. By placing the crossbars on 4 inch centers, several of the smaller parts could be hung from one bar; larger parts occupied one full cross-bar.

The conveyor was constructed of heavy 1-inch diameter pipe sections, 7 feet long, on 4 inch centers. These pipes were inserted into 2-inch-long extended pins of the conveyor chain, with proper clearance for horizontal movement. The pipe crossbars were built with spacer washers welded into position for proper spacing of the work hooks in relation to the several sizes of work being processed.

The conveyor operates at 3.125 feet per minute, and travels in the normal fashion throughout the system, except immediately beyond the dip tank. At

this point the conveyor is tilted at a 15 degree angle, so that the two conveyor chains travel at different levels over the entire length of the drainboard to hasten the draining of the dipped parts.

Initially, each piece of work is loaded in a tilted fashion by means of short and long work hooks. The additional tilt over the drainboard assures complete draining of the parts before they reach the baking oven.

The headshaft to tailshaft centerline is 275 feet, indicating the overall length of the system. The main conveyor drive consists of a variable speed motorized reducer equipped for a 3 to 1 ratio.

Dip Tanks

Dip tanks are equipped with agitators and a motor driven circulating and pumping system, to prevent viscosity changes and keep pigment particles thoroughly dispersed in the paint.

Four such dip tanks, each with a different color of paint, are located on tracks occupying the floor space between the moisture dry-off zone and the dipping station. When paint color change is desired, the tanks are manually pushed to the section of track located under the drainboard. Sixty feet of track is available for tank storage.

Baking Oven

The basic considerations in oven de-

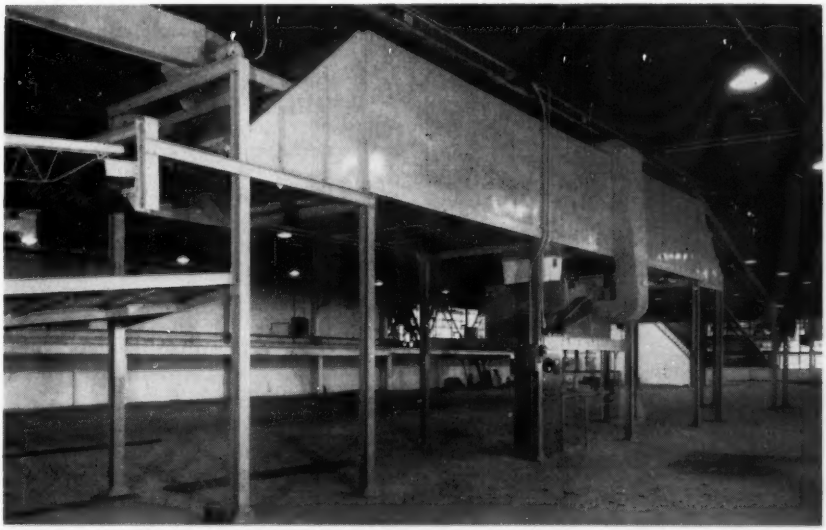


Fig. 1 — Overall view of oven used to bake finishes on sheet metal parts. Continuous crossbar conveyor can be seen entering (left foreground) and leaving the oven.

sign necessary to achieve excellent finishes on the work can be described as: efficient air distribution over the work; temperature uniformity in the baking zone; correct exhaust conditions to maintain proper oven atmosphere; and a low overall temperature gradient between the supply and recirculation temperatures.

The oven is constructed of a 4-inch thick rockwool insulated sheet metal panel shell, measuring 45 by 9½ by 6¾ feet, with semi "A" type sheet metal hoods at the entrance and exit ends to form an efficient heat seal. Access doors placed at each side of the oven allow for access to the work, and adjustment of the ductwork dampers. The entire oven shell is supported above the floor by heavy structural "H" columns and channel crossbeams.

Along the entire length of the oven floor large volume air supply ducts were furnished, with fully adjustable dampered outlets, so arranged that the heated air is guided uniformly over the work. At the entrance of the oven, where the volatile solvents are to be removed from the paint, exhaust pick-up ducts are located underneath the oven roof. Actually the exhaust duct begins to pick up solvent fumes before parts enter the baking zone. This duct is connected to the inlet side of a large volume exhaust fan, whose primary function is to exhaust a portion of the oven atmosphere to maintain safe operating conditions within the oven zone. As the hot air is pulled from the main oven zone it passes over the freshly dipped parts and flashes volatiles from the surface before the parts reach the baking zone of the oven.

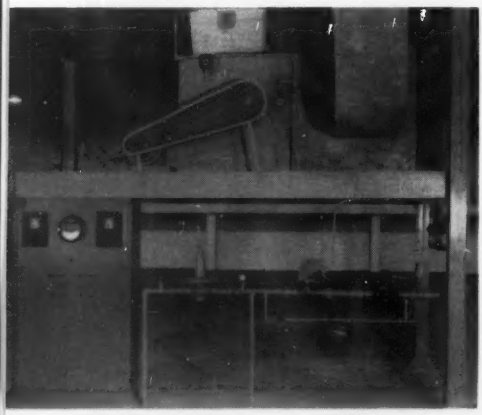


Fig. 2—Control panel and part of recirculating system for Interior Steel Equipment Company's baking oven. Air is reheated to desired temperature and returned to the oven. Gas burner is located on the right side of the heater.
(Photos courtesy W. W. Sly Manufacturing Co., Cleveland, Ohio.)

The fan creates an efficient air seal at the open entrance of the oven by drawing air from both the oven and the room. After approximately four minutes of preheating, the work passes into the high temperature of the oven where the finish is thoroughly baked.

Recirculation ducts extending approximately three-quarters of the oven length are mounted underneath the oven ceiling, directly above the supply ducts. A major portion of the supply air is taken into this duct after the heated air passes over the work and is returned to the air heater by the action of the suction inlets of the heater fan within the heater casing. This air is returned to the heater at a slightly lower temperature than the supply air. It is reheated to the desired temperature and returned to the oven.

Heated air for the system is furnished by a self-contained 2,500,000 BTU per hour direct gas-fired heating unit mounted on its own structural platform underneath the oven.

A high temperature double width,

double inlet centrifugal fan placed within the heater casing, provides approximately 16,500 cu. ft. of air per minute, which accounts for 6 air changes per minute in the oven.

The heater was sized not only on the basis of heat required to bring the parts to baking temperature, but more correctly, from the air and solvent load. This exhaust air load was based on the air requirements to maintain a safe oven atmosphere.

Safety Controls

Electronic safety controls, part of the air heater equipment, protect the system against any kind of flame, fuel, power, or mechanical failure. The fuel input is regulated according to the demand of the main temperature indicating controller (Fig. 2), the actuating bulb of which is located in the oven zone.

Protective controls prevent the system from exceeding safe operating temperatures by means of the high-limit controller bulb located directly above the supply fan outlet. This control also prevents temperature buildup anywhere in the system.

An important function of this safety control setup is the time-delay relay system, which imparts an interruption in the starting cycle or purging period, during which time all of the fans in the system must be in operation for a predetermined period of time before the ignition of the gas at the main burners, or even at the pilots themselves, can be accomplished.

Design Considerations

The reasons for design determinations in this installation have been explained. In terms of plant layout, the entire finishing system fits into present or future production flow lines, as is required of any efficient plant layout.

★ ★ ★

Automatic Polishing of Wash Machine Crowns

A 17-foot rotary automatic polishing and buffing machine has been built by Acme Manufacturing Co. to finish aluminum washing machine crowns for the Maytag Company.

This installation uses an Acme standard 10-foot rotary automatic machine fitted with 12 special overhanging segments, each equipped with roller feed units having individual drives (Fig. 1).

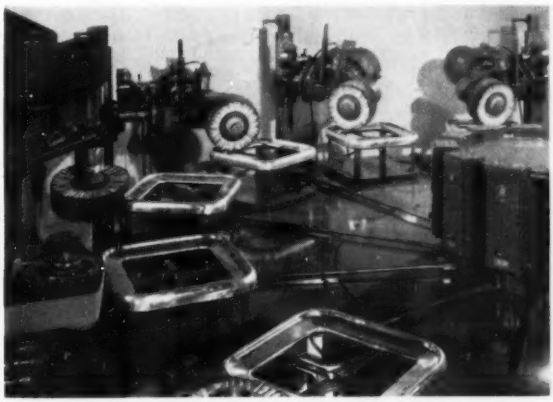


Fig. 1—Close-up view of Acme Rotary Automatic Polishing and Buffing Machine at Maytag Co. Note belt and wheel positions in relation to the work. The work holders rotate in each work position, and the entire machine indexes to complete a polishing cycle.

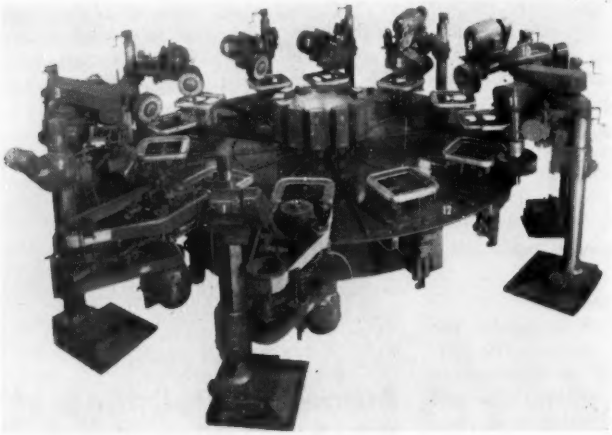


Fig. 2 — Acme Rotary Automatic Polishing and Buffing Machine. An indexing type, 11 stations are used for work stations and the remaining station for loading and unloading.

It is an indexing rotary type, using nine Acme G-3 polishing and buffing lathes with fully adjustable floating heads and two Acme G-3 polishing belt heads with vertical oscillation. One man can operate the machine, which uses one station for loading and unloading (Fig. 2). The two polishing belt heads polish draw marks on the sides of the part, while nine floating lathes cut and color the aluminum crown. Parts may be rotated clockwise or counter-clockwise as required in the cycle.

★ ★ ★

High Speed Flow Coating of Navy Jet Parts

THE longest continuously moving paint line of its kind capable of flow coating 6400 Navy jet plane parts an hour is in operation at the Torrance, Calif., facility of Douglas Aircraft Company's El Segundo Division.

The automatic paint line is an electrically driven overhead monrail system nearly half a mile long. It can be operated at speeds of 10 to 30 feet a minute.

The conveyor dips into five different production locations to receive, without pausing, loadings of newly formed sheet metal airplane parts. At one point the conveyor plunges underground into a 378-foot tunnel divided into chambers. Here the parts move through a dozen different automatic phases, such as washing, rinsing, drying and various chemical treatments.

The painting system can accommodate parts a square inch in size to as long as six feet. They are hung on squeeze-type loops (Fig. 1)

Fig. 1 — Aircraft parts are loaded on Douglas-designed hooks, spaced 4 inches apart on the conveyor, for processing through the continuous cleaning system and flow coat paint system.

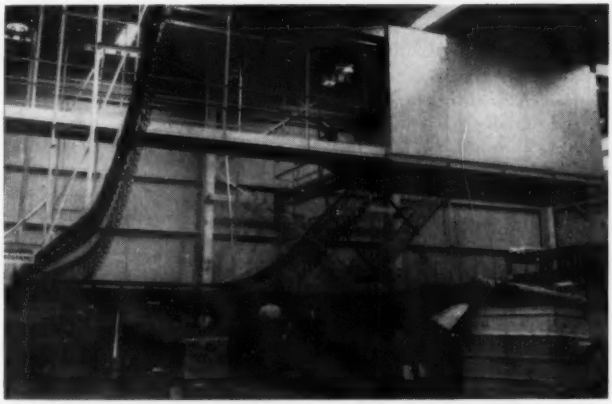


Fig. 3—Zinc chromate primed parts enter the overhead drying oven (top center of photo), then drop down to floor level for unloading and inspection. *(Photos courtesy El Segundo Div., Douglas Aircraft Co., Inc., El Segundo, Calif.)*

suspended from hooks fixed at four-inch intervals along the roller chain of the 2100 foot steel monorail.

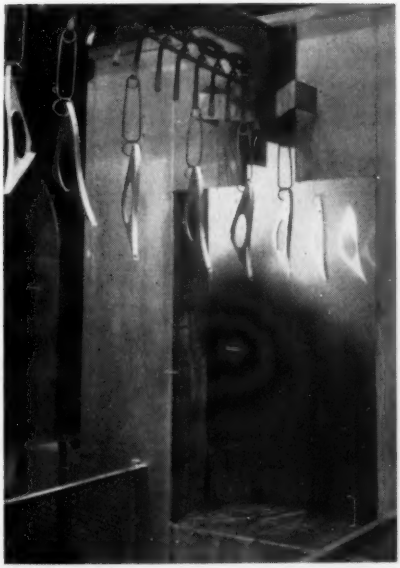


Fig. 2—A view of the entrance to the 378-foot long underground processing chambers where aircraft parts are cleaned and prepared for painting while on the overhead conveyor.

At low pressure paint is slushed on the parts with a fan-like action from banks of nozzles on the sides and bottom of the processing chamber. With the new flow coating system uniform quality and thickness of finish is attained.

The flow coater utilizes 30 to 40 gallons of zinc chromate primer on the two eight-hour work shifts on which it is being operated at present. Agitation necessary in dip coating is supplied in the flow coating process when the paint is pumped from the sump to the nozzle banks.

In operation, a shop work order is enclosed in a tube and hung on the conveyor line. Parts are hooked on from any one of the five loading stations. The monorail curves sharply upward as it leaves a loading station to afford work space underneath.

The following lists in detail each step parts undergo after entering processing chambers (Fig. 2):

1. Alkaline spray cleaner Ridoline* #46 with Ridosol* #71 as wetting agent.

2. Hot water rinse.
3. Cold water rinse.
4. Alodine* #1200.
5. Rinse.
6. Dilute solution of Alodine #1200.
7. Dry in 60 foot oven—250 deg. F.
8. Cold air blast.
9. Apply zinc chromate primer in flow coat booth.
10. Rise to first floor level elevated position where drying oven (Fig. 3) maintains 190 deg. F. This heat automatically shuts off whenever line stops because temtemperature must not rise to annealing limits.
11. Line next dips to central unloading area where parts are inspected and distributed to assembly or to stock along with work order.
12. The line then rises to overhead stripping chamber where hooks are cleaned of accumulated primer before continuing.

The paint system is a product of Industrial Systems, Inc., of Los Angeles.

The paint system will be used to process parts for the F4D Skyray jet interceptor, the U. S. Navy's fastest airplane, and other combat craft for the seagoing service.

★ ★ ★

"MOVEMENT IS LIFE" is the title of a new 20-minute 16 mm. motion picture sponsored by the Conveyor Equipment Manufacturers Association, Washington 5, D. C. The scope and variety of jobs done by conveyors throughout the economy are depicted in scenes of actual installations. The script shows how mechanical handling by conveyors increases employment and profits and raises the standard of living.

Black-and-white prints may be borrowed from Modern Talking Picture Service, 45 Rockefeller Plaza, New York, N. Y.

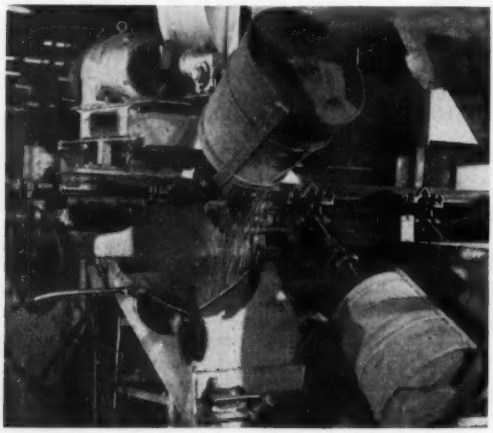
★ ★ ★

BARREL PLATING FILM. A 16 mm. sound motion picture featuring automatic barrel plating and processing is now available from **Frederic B. Stevens, Inc.**, Detroit 16, Michigan.

The operational economy obtained from continuous automatic barrel zinc and cadmium electroplating, bright dipping, rustproofing and washing operations is described. The major portion of the film was made in the new Elgin, Illinois, plant of Illinois Tool Works' Shakeproof Division.

The film audience is able to see how the straight-flow automation system, employing four Stevens Automatic Barrel Electroplating and Processing Machines, at the new Shakeproof plant moves approximately 500,000 different items through seven major plant departments.

To make arrangements for a showing of "Industrial Album" for your plant engineers, your plant operating group or your local trade association call your nearest Stevens sales office or write direct to Frederic B. Stevens, Inc., Detroit 16, Michigan.



Scene from Stevens Film, "Industrial Album."

* Registered Trade Name, American Chemical Paint Co.

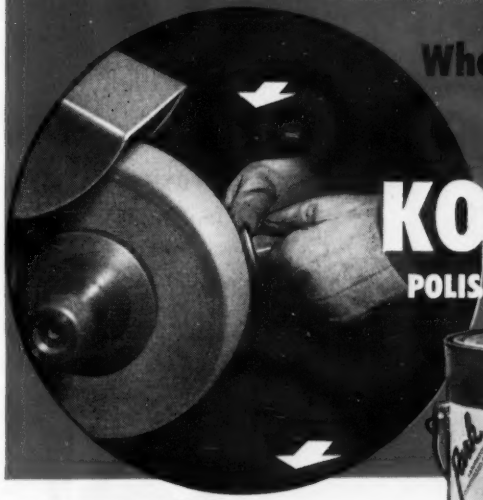
Wheels CUT FASTER, LAST LONGER

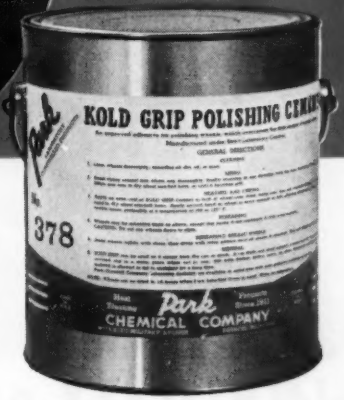
When treated with

Park

KOLD-GRIP

POLISHING WHEEL CEMENT





KOLD-GRIP Polishing Wheel Cement, laboratory-controlled through every step of production, will arrive at your plant *ready for use!* Viscosity is constant, regardless of normal temperature variations and the cement can be applied directly from the container . . . *without mixing or heating.* Kold-Grip is clean, odorless and very easy to handle.

Coarse or fine-grain abrasives set up right for fast cutting efficiency. Substantial savings are effected through longer over-all wheel life, fewer set-ups and reduced wheel inventory.

Wheels dry rapidly, are unaffected by humidity changes, and may be stored in any convenient plant area.

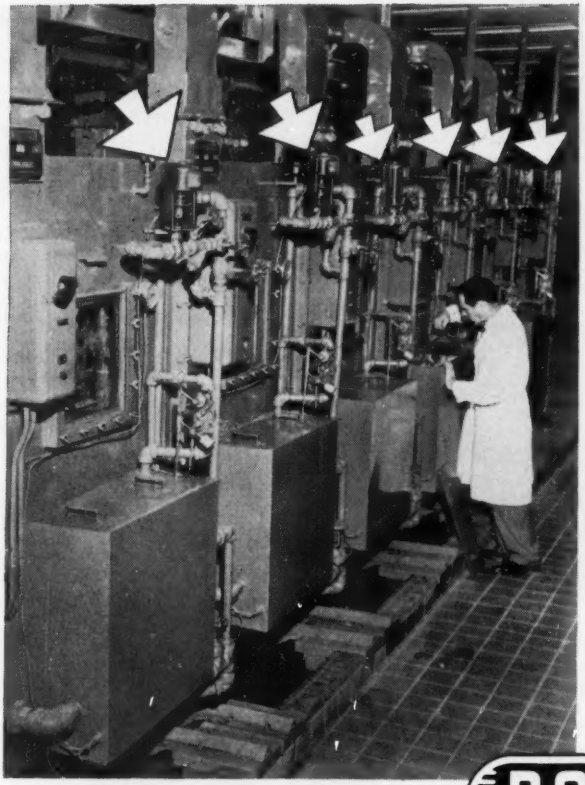
Let our polishing engineer demonstrate Kold-Grip for you, or send for free sample, telling us the metal to be polished, grain sizes to be used, and drying facilities available. We can help you if we hear from you.

• Liquid and Solid Carburizers • Cyanide, Neutral, and High Speed Steel Salts • Coke • Lead Pot Carbon • Charcoal • No Carb • Carbon Preventer • Quenching and Tempering Oils • Drawing Salts • Metal Cleaners • Kold-Grip Polishing Wheel Cement

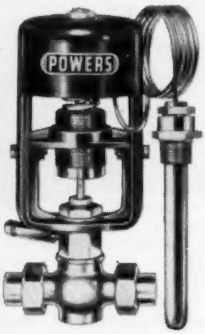
LICENSED MANUFACTURER: Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England

Park

CHEMICAL COMPANY
8074 Military
Detroit 4, Mich.



AT
WYANDOTTE CHEMICAL CO's.
Modern research laboratories METALWASH Spray Washer is controlled by POWERS No. 11 Temperature Regulators



SIMPLICITY of POWERS

No. 11 Self-Operating Regulators, plus their years of reliable control plus availability of SERVICE, in 60 Cities, if required,—are reasons why equipment manufacturers like to use POWERS No. 11 regulators shown above. Bulletin 329 describes their many points of superiority. Write for a copy. (c5)

THE POWERS REGULATOR CO.
Skokie, Ill. • Offices in 60 Cities • See your phone book

Over 60 Years of Automatic Temperature and Humidity Control

Every step in the manufacture of Sylvania vacuum-metalizing source heater materials is performed under exacting quality control in Sylvania's own plants . . . from tungsten ore, to wire, to finished coils and strand. Special tungsten wire is coiled specifically for vacuum metalizing to assure maximum service life as well as maximum evaporating capacity for your requirements.

Sylvania offers you a wide selection of ready-made tungsten coils, in single or multiple strand . . . each designed for a specific metalizing job. If you prefer to form your own coils, you have a full range of wire diameters and types to choose from. Write for "*Sylvania Tungsten Filaments for Vacuum Metalizing.*"

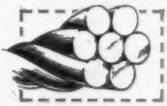
SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 19, N. Y. *In Canada:*
Sylvania Electric (Canada) Ltd., University Tower Bldg., St. Catherine St., Montreal, P. Q.

Which is better –

THIS?

Sylvania research has shown that, for the same relative cross section, coils of fewer strands and larger diameter last longer.

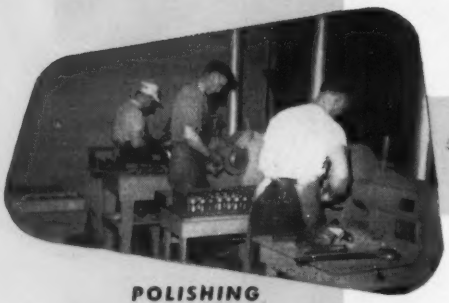
OR THIS?



Coils made of a large number of smaller strands are subject to excessive diameter reduction . . . give shorter service life.

SYLVANIA

Lighting • Radio • Electronics • Television • Atomic Energy



POLISHING

CLEANING

PLATING

FINISHING

New • EQUIPMENT • MATERIALS • PROCESSES

Liquid Neoprene Coating

A "self-curing" liquid neoprene coating has been announced by the Palladium Mastic Corporation of America, for use in the chemical, plating and other process industries as well as in metal fabricating plants.

Called Palladium* Liquid Neoprene, it is recommended for the protection of equipment and structures against splashing, fuming or spillage of non-oxidizing inorganic acids, alkalies, inorganic salts and most polar solvents.

It is also effective where chipping and abrasion due to rough handling are problems. The rubbery texture and high thickness per coat provide extended service life. Coatings may be applied by brush or spray.

More information about application procedures and specific resistance characteristics is available from Emjay Maintenance Engineers, 327 Union Avenue, Rutherford, New Jersey, or by circling No. 1 on Reader Service Card inside back cover.

*Reg. Trade Mark

★ ★ ★

Miniature Plating Barrel

An addition to its line of oblique plating barrels has been announced by Daniels Plating Barrel & Supply Company, Newark 5, N. J. This unit, the 3H, is a miniature plating barrel having a cylinder 3 inches in diameter by 3 inches deep with approximately ¼

pound load capacity. The 3H is a complete bulk plating machine, consisting of a high temperature clear plastic tank and cylinder and a 110 volt 60 cycle single phase motor drive. Since tank capacity is only 1 gallon, the unit is ideally suited for precious metal plating where solution volumes must be kept small.

In addition to standard and experimental plating techniques, the 3H is particularly adaptable for cleaning, pickling or deplating of precious metal plated parts for reclamation.

Standard optional equipment includes a cathode rod for still tank plating. A further innovation is an optional horizontal plating cylinder constructed of high temperature clear plastic, with dangler type negative contacts and single drop-in door. This cylinder is 3 inches in diameter by 4 inches long. The horizontal type cylinder just described is also interchangeable with the oblique type cylinder. Both units are designed to fit and operate in the standard 3H plating tank.

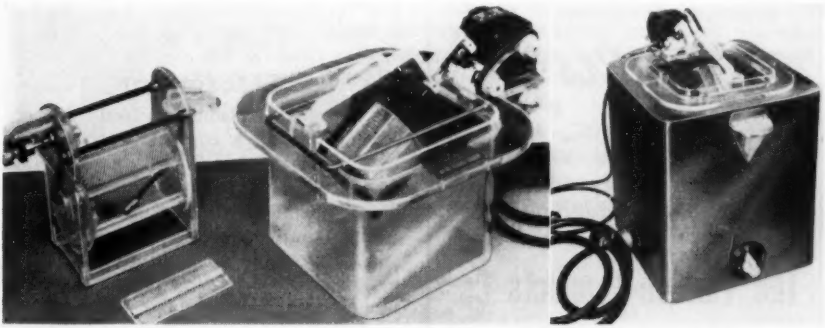
For further information, write Daniels Plating Barrel & Supply Co., 129 Oliver St., Newark 5, N. J., or circle No. 2 on Reader Service Card inside back cover.

★ ★ ★

Portable Drying Unit

An improved infra-red portable heating and drying unit has been introduced by North American Electric Lamp Co., St. Louis, Mo.

The unit is designed especially for heating and drying purposes in the au-



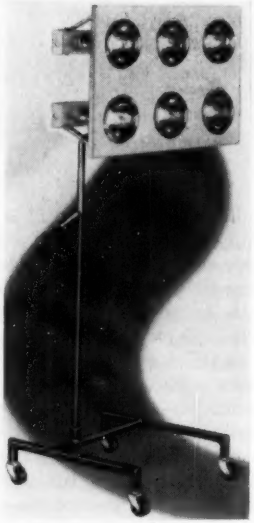
Daniels Standard 3H Plating Barrel, showing interchangeable horizontal plating cylinder (left), and oblique plating cylinder (center, in clear plastic plating tank). Right: Daniels 3H Precious Metal Plating Unit, in a stainless steel water jacketed tank, with immersion heater and temperature control.

tomotive, electrical and manufacturing fields. Models are available with five, six and 13 Nalco inside-aluminumed, self-reflecting, carbon-filament lamps, and are adjustable in height from 18 inches to six feet. They are mounted on four free-moving casters for maneuverability, making them especially convenient where space is limited.

Nalco assemblies can be tilted to any angle or swung in a vertical or horizontal position for concentrated heating and drying. Two or more of these units can be combined to form continuous banks for large area drying.

Strips assembled in three to 14-lamp units are also available from North American. These assemblies can be used for small jobs, or grouped to form banks for large area coverage.

All North American Infra-Red portable units and strips are constructed of tubular steel to ensure long wear under heavy usage.



Nalco Portable Infra-Red Drying Unit

For further information, write North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo., or circle No. 3 on Reader Service Card inside back cover.

★ ★ ★

Chlorinator

An improved solution feed type chlorinator with a corrosion-proof polymer-impregnated fibre glass cabinet has been developed by the Fischer & Porter Company, Hatboro, Pa. Use of the diaphragm regulator principle makes possible a safe, mechanically-enclosed chlorinating machine constructed entirely of corrosion resistant materials.

Manual adjustment of chlorine gas injection is made by the rate valve on

FUNCTIONAL FINISHES!!

If you require your coatings to accomplish some specific task — something beyond mere ornamental appearance or average longevity —

Try Us!

We make ACRYLIC, ALKYD, CELLULOSIC and VINYLOID coatings for a very wide range of specialized industrial applications.

The Varnish Products Co.

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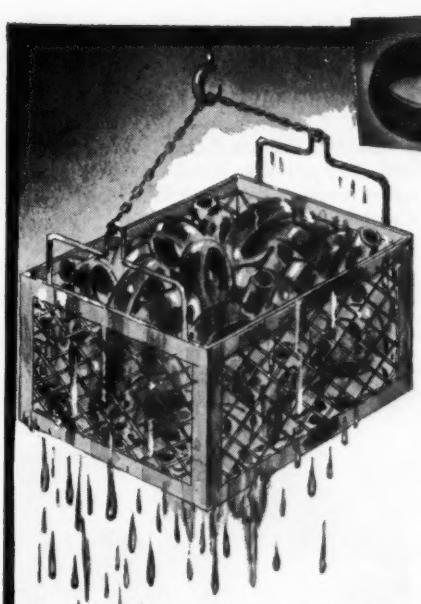


No buffing compound remains after this aluminum casting has been precleaned with a Magnus Emulsion Cleaner.

When You PRECLEAN Thoroughly

You've Done 90% of Your Cleaning Job!

Precleaning, properly carried out, gives you physically clean surfaces that require only the finishing touch of electrocleaning or alkaline cleaning to give you the *chemically* clean metal that insures trouble-free plating. Contamination of these final cleaning baths is eliminated, and you have complete assurance of consistently uniform plating results.

BUT . . . Be Sure of Your Precleaning Operation

Magnus makes many chemical compounds that can be used for precleaning, depending on the nature of the dirt to be removed. The Magnus line of Cleaning Machines—batch, continuous and special—speeds up and improves the quality of the precleaning operation. On the majority of precleaning operations a simple dip or spray with Magnus Precleaner, followed by a thorough water rinse, will give you thorough precleaning.

ASK FOR A DEMONSTRATION

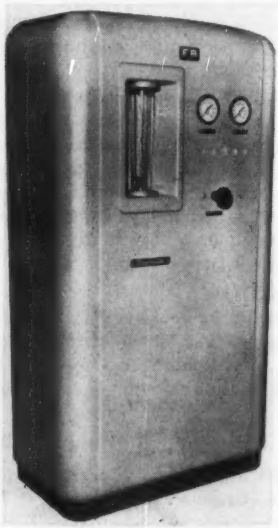
. . either in your own plant or in the Magnus Pilot Laboratory. We'll suggest the precleaning chemical best suited to your operation, and indicate at the time of demonstration whether or not the use of a cleaning machine is desirable for speeding up the operation.

magnus

MAGNUS CHEMICAL CO., INC.
208 South Ave., Garwood, N. J.
In Canada: Magnus Chemicals, Ltd., Montreal
Service Representatives in Principal Cities

the front of the cabinet, and the actual flow rate is observed through the glass flow meter. Six metering tube and float combinations, interchangeable from the front of the cabinet, provide 10 to 1 or greater overlapping flow ranges from a minimum of 100 pounds per day to a maximum of 8,000 pounds per day of chlorine gas.

In addition to manual chlorine flow rate adjustment, the chlorinator is available with the following automatic functions: automatic proportioning by a transmitted pneumatic signal from an orifice, venturi, or variable-area flow meter; automatic proportioning by mechanical connection to a float in a flume, weir or tank; remote pneumatic set; program controlled operation, single or multiple cam-operated; timer sequence control; automatic pump sequence control; and automatic start-stop control.



Chlorinator

Complete descriptive material and specifications are available from Warren H. Lauder, supervisor, Technical Publicity, Fischer & Porter Company, 296 Jacksonville Road, Hatboro, Pa., or by circling No. 4 on Reader Service Card inside back cover.

★ ★ ★

Acid Proof Pipe Fittings

Complete piping systems to handle corrosive liquids in industry have been made practicable by the reducing bush-

Boltaron 6200 Acid Proof Pipe Fittings

ings, plugs, unions and caps available in the line of Boltaron 6200 fittings. This announcement has been made by H. N. Hartwell & Son, Inc., Boston, exclusive distributors of this Bolta-Hartwell product.

Used in conjunction with Boltaron pipes and valves of unplasticized polyvinyl chloride, the fittings of the same material make possible a continuous system for use in solving plant corrosion problems. They are made in standard I.P.S. sizes (⅛, ¼, ⅜, ½, ¾, 1, 1¼, 1½, and 2 inches) matching the rest of the line.

Boltaron 6200 has shown excellent chemical resistance to organic and inorganic acids, and to alkalies.

A nontoxic material, Boltaron may

NEW MIDLAND PRODUCTION FACILITIES BRING FASTER SERVICE AND DELIVERY TO USERS OF

Dow Sodium Orthosilicate

A timely reminder about why your industry prefers this particular heavy-duty cleaning compound

Dow Sodium Orthosilicate, solidly established as the *preferred* heavy-duty cleaning compound, is now available in *greater quantity*. Volume production has been inaugurated at The Dow Chemical Company's Midland Division. These new facilities, added to the Sodium Orthosilicate plant in Freeport, Texas, permit Dow to completely meet the increased demand for this remarkably efficient compound.

The centrally located Midland producing point means, too, that Sodium Orthosilicate orders can be processed more rapidly . . . and your shipment reaches you faster. More floor space is freed from storage demands, yet the cleaning operation can proceed smoothly without any fear of Sodium Orthosilicate shortage.

Dow's new, improved full open-head drum is available for Sodium Orthosilicate shipments from Midland as well as from Freeport, Texas. This superior shipping and storage container, designed and manufactured exclusively by Dow, results in definite transit and handling advantages for the user.

These continuing efforts to bring you an economical and uniformly efficient cleaning compound that really does a heavy-duty job . . . these expansions of production and distribution facilities to serve your needs better and faster . . . these improvements in basic package design to cut your handling and storage costs . . . present a convincing answer to anyone in *your* industry who wonders why Dow Sodium Orthosilicate has won wide acceptance. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

be drawn, formed, molded, machined and welded by the hot air method. It is adaptable to specific industry needs and may be had in 30 by 60 inch sheets in 1/32 to 1 inch thicknesses, and in 10 foot rods in ¼ to 2 inch thicknesses, and as pipes, valves and fittings.

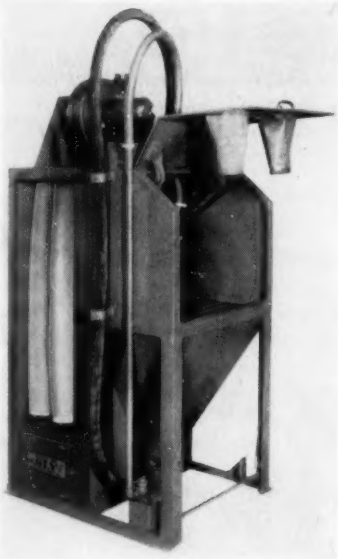
For further data circle No. 5 on Reader Service Card inside back cover.

★ ★ ★

Blast Cabinet

A blast cabinet and dust collector combination which occupies a minimum of space has been announced by the W. W. Sly Manufacturing Co. Designed for cleaning small metal parts (ferrous and non-ferrous), it can also be adapted to soft grit blasting.

Called the "Blast-Filter Combo," the dimensions are 2 feet 6 inches by 3 feet 3 inches by 26 inches high. The height of the work area has been planned for greatest efficiency. The unit is easily accessible from two sides. Operation is by a foot operated spring treadle; pressing on the treadle starts the operation, lifting the foot stops it.



Compact Blast Cabinet

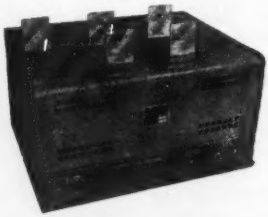
The Blast-Filter Combo has an integral suction cloth-type dust collector. Air is filtered prior to reaching the fan, thereby protecting the fan from wear. The dust hopper is accessible by loosening wing nuts. Complete information may be obtained by writing The W. W. Sly Manufacturing Co., 4784 Train Ave., Cleveland, Ohio, or circling No. 6 on Reader Service Card inside cover.

★ ★ ★

Horizontal Speed Lathe

A special horizontal speed lathe has been designed and built by Acme

★



P.R. (Periodic Reverse)

THE MODERN WAY TO THE FINEST PLATING

WRITE FOR INFORMATION

UPA

UNIT PROCESS ASSEMBLIES, INC.

75 East 4th St. • New York 3, N. Y.

Be sure of rack coating

that saves you work and money

... use COATING 218X

IN plastisol Unichrome Coating 218X you get genuine quality which quickly shows up on the job. It withstands all plating, anodizing and cleaning cycles – even those with *vapor degreasing cycles*. This keeps coating costs at bedrock, simplifies racking. Coating 218X won't contaminate even the "fussiest" of plating solutions – thereby avoiding future trouble and costly downtime.

This resilient coating doesn't chip, crack, blister. It rinses freely, cuts dragout, minimizes drag-in. Little wonder that Coating 218X is used so widely by cost-conscious platers.

Remember, Coating 218X is produced by United Chromium . . . the only company that has: (1) Developed plating processes; (2) Given service on plating problems; (3) Ten years experience in formulating highly corrosion-resistant plastisols . . . and therefore knows what quality a rack coating needs for most economical plating service.

UNICHROME Trade Mark **COATINGS for METALS**

Products of UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N.Y. • Detroit 20, Mich. • Waterbury 20, Conn. • Chicago 4, Ill.
Los Angeles 13, Calif. • In Canada: United Chromium Limited, Toronto 1, Ont.

Manufacturing Co., of Detroit, Mich., manufacturer of automatic polishing and buffing machines, for manually removing defects from jet engine compressor wheels. It has also found a place in the automotive industry where it has been used for polishing axle shafts, torsion bars, and many other parts.

In its basic form it consists of a cabinet base, a head stock and a tail stock. One of its many features is the spindle assembly. The spindle is hardened and ground and rotates on antifriction bearings encased in a cartridge type housing. The spindle nose can be made to suit customer requirements. A combination flywheel and hand wheel is provided to give uniformity of rotation and permit manual turning of the work spindle.

A dry disc clutch is mounted on the spindle and is disengaged by means of a hand lever mounted on the side of the head stock. The work spindle is driven by multiple V-belts through a reduction unit which provides stepless spindle RPM ranging from 50 to 300. This speed control permits the same surface work speed to be maintained from the inner to the outer diameters of the work piece. The tail stock is a conventional quick clamping type and is designed for heavy duty work.

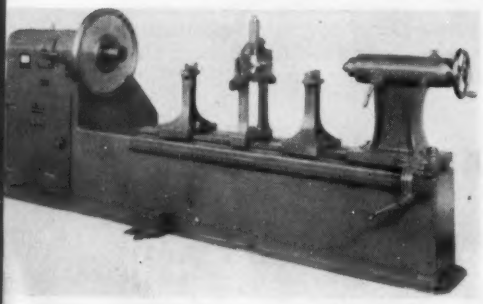
The spindle is hardened and ground and a tang slot is provided to facilitate ejection of centers. The tail stock screw is hardened and ground and the thrust is taken against a roller bearing. The bed ways are protected from foreign matter by shear wipers. The tail stock travel adjustment is of the rack and pinion type which may be easily disengaged and moved manually. Work rests and steady rests can be provided. The overall dimensions of the machine are 130 by 37 by 52 inches high.

For further data circle No. 7 on Reader Service Card inside back cover.

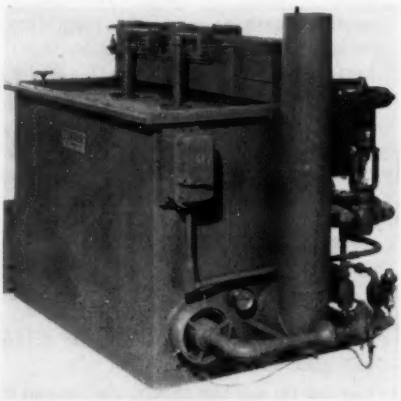
★ ★ ★

Mechanical Washer

A pneumatically operated artillery shell washer has been built by the Currier Co., Oakland, California. It is gas fired, explosion proof, and built specifically to wash the interior of shells on a production line basis. The unit can be manufactured to wash any type of



Special Acme Horizontal Speed Lathe



Currier 2-SG Mechanical Shell Washer

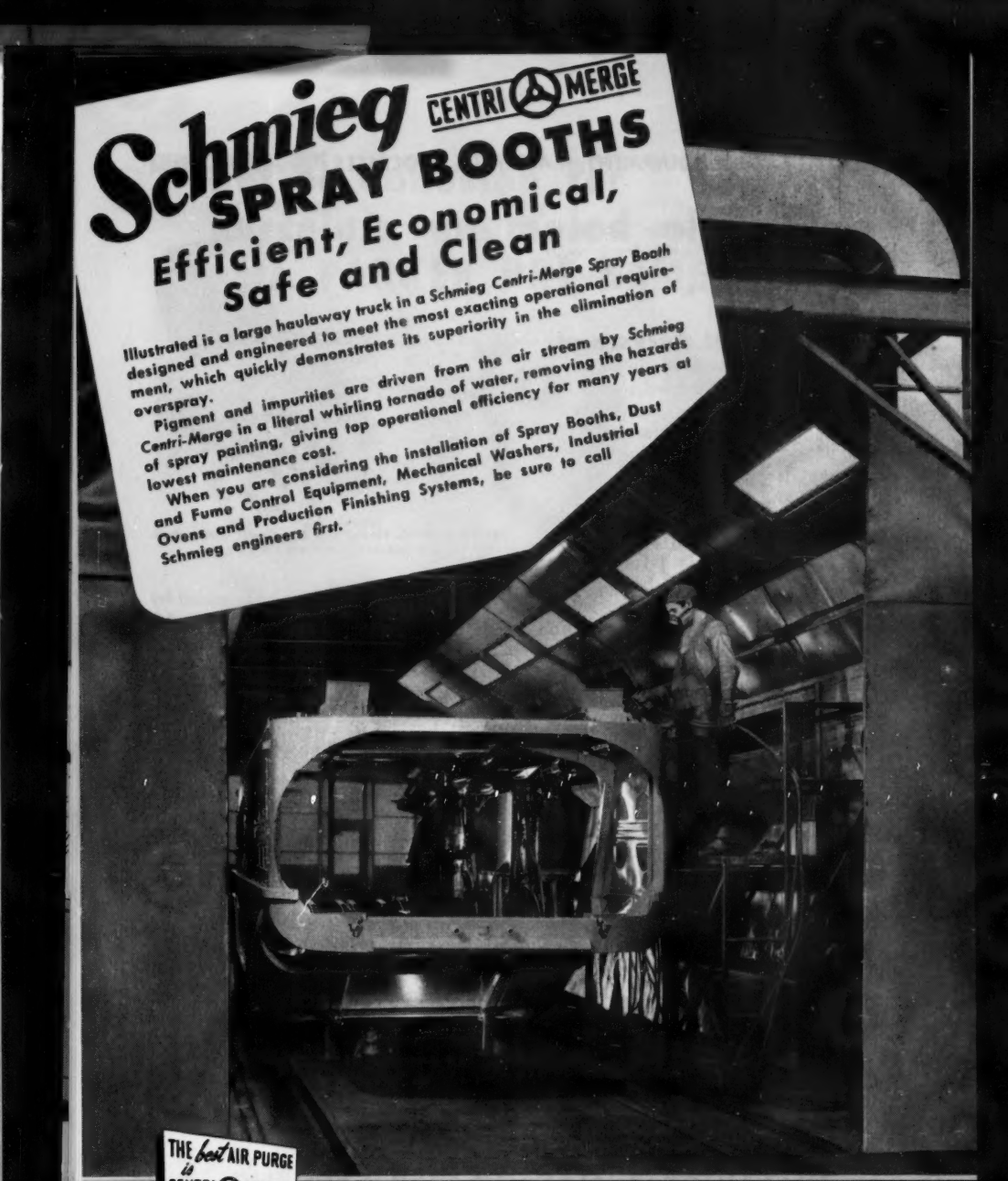
Schmieg CENTRI-MERGE SPRAY BOOTHS

Efficient, Economical, Safe and Clean

Illustrated is a large haulaway truck in a Schmieg Centri-Merge Spray Booth designed and engineered to meet the most exacting operational requirement, which quickly demonstrates its superiority in the elimination of overspray.

Pigment and impurities are driven from the air stream by Schmieg Centri-Merge in a literal whirling tornado of water, removing the hazards of spray painting, giving top operational efficiency for many years at lowest maintenance cost.

When you are considering the installation of Spray Booths, Dust and Fume Control Equipment, Mechanical Washers, Industrial Ovens and Production Finishing Systems, be sure to call Schmieg engineers first.



THE best AIR PURGE is CENTRI-MERGE

Schmieg INDUSTRIES INC.
Engineers & Manufacturers
DETROIT, MICHIGAN

P. O. ADDRESS: 23930 SHERWOOD, CENTER LINE, MICH.

shell or tubular item.

For further data circle No. 8 on Reader Service Card inside back cover.

★ ★ ★

Bench Model Backstand

Model 524, a bench model abrasive backstand, has been added to the line of backstands manufactured by Hammond Machinery Builders, Inc. This backstand will convert existing grinders and polishers into abrasive belt machines.

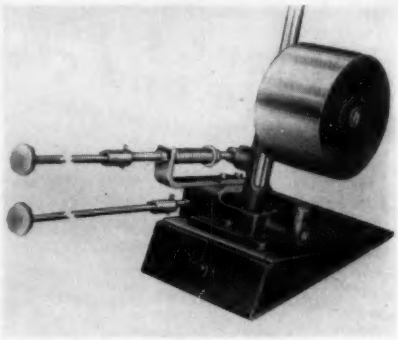
Model 524 is intended for production work on light polishing or deburring operations. Belts up to 4 inches wide can be used. Mounting brackets for floor or wall mounting are available to facilitate easy installation. Extension controls for tracking and tensioning can be furnished so that adjustments can be made at the operator's working position.

For further information, write Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Mich., or circle No. 9 on Reader Service Card inside cover.

★ ★ ★

Cadmium Electroplating Process

An improved process for electroplating of cadmium has been announced by Frederic B. Stevens, Inc., Detroit 16, Michigan.



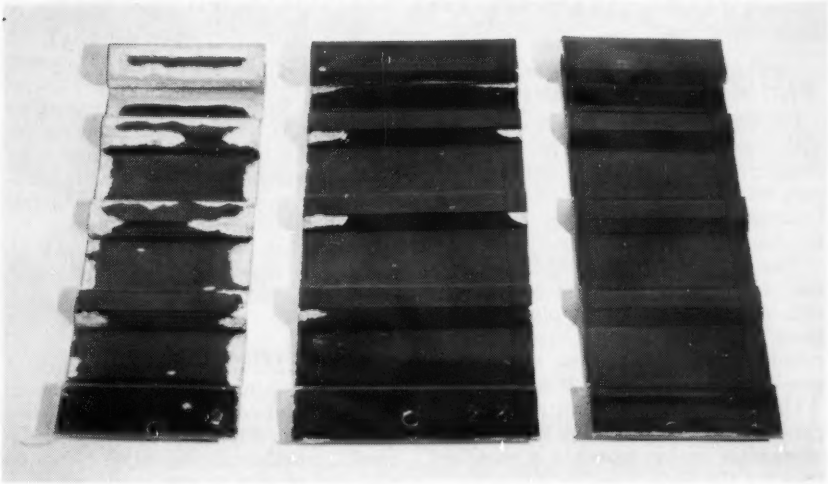
Hammond Bench Model 524 Backstand with mounting bracket and front controls.

Stevco Bright Cadmium Process was designed especially to supply the demands of industry for a bright cadmium deposit to meet definite thickness of deposit and corrosion protection specifications for iron and steel plating.

Use of a Stevco Liquid Brightener permits easy control of the process and allows complete and immediate integration with the solution. This feature increases economy in operation while providing an easier and faster method of handling additions as required, states the manufacturer.

GLO-QUARTZ*
IMMERSION HEATERS
for
ALL ACIDS, ALKALIES, WATER, ETC.
GLO-QUARTZ ELEC. HEATER CO., INC.
WILLOUGHBY, OHIO
*Trademark Reg. U. S. Pat. Off.

Better adhesion for porcelain enameled aluminum with PARKER PRE-NAMEL 420



Results of accelerated spalling test. These sections of porcelain enameled structural aluminum were immersed in 5% solution of NH_4Cl for 96 hours. Left, untreated aluminum; center, conventionally pretreated aluminum; right, aluminum pretreated with Parker Pre-Namel 420

Here is a simple, money-saving pre-treatment which results in improved adhesion of porcelain enamel on aluminum and increases the durability several times.

Parker Pre-Namel 420, applied either by immersion or spray, produces a thin coating integral with the metal. This coating is an excellent base for the porcelain enamel.

Parker Pre-Namel makes the enameling of aluminum simpler, faster, and more economical:

It eliminates the need for pre-firing, thus effectively increasing existing furnace capacity 25% or more.

It operates at room temperature.

It produces good results within a time range of 30 seconds to 10 minutes.

It minimizes carry-out of processing material.

Parker Pre-Namel solution is replenished at intervals, need never be discarded.

This new pre-treatment extends the usefulness of porcelain enameled aluminum by adding durability while reducing the cost!

*Parker Pre-Namel—Reg. U.S. Pat. Off.

Send for Technical Bulletin

Illustrated bulletin "Parker Pre-Namel 420" will be sent free, on request.

Since 1915—Leader in the Field

PARKER RUST PROOF COMPANY

2172 E. Milwaukee, Detroit 11, Michigan

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

Further data and details on Stevco Bright Cadmium Process are contained in Stevens Technical Bulletin P-131, which may be obtained by circling No. 10 on Reader Service Card inside back cover.

★ ★ ★

Plating Solution Analyzer

Plating solutions can be analyzed with accuracy and speed by means of an electro polarizer and a portable galvanometer, according to the Patwin Instruments Co. and the General Electric Co., suppliers of the equipment.

The Patwin electro polarizer utilizes the polarographic method of analysis, which saves time. Most plating solutions, including copper cyanide, zinc cyanide, cadmium, brass, and nickel can be analyzed with the equipment.

Use of the General Electric portable galvanometer instead of a built-in galvanometer makes possible a standard case for the instrument.

The electro polarizer eliminates the need for maintaining and standardizing several solutions. In practice, the substance to be determined is dissolved in an electrolyte solution. A small glass cell containing the solution is fitted with the polarizing electrode and a reference electrode. As electrical potential is applied, very little current flows until a potential which is characteristic of the particular substance is reached. After that point, a polarographic curve results. If the curve showing the relationship between current and voltage is plotted, a "wave" for the substance develops, and further analysis determines its amount and type.

For further data circle No. 11 on Reader Service Card inside back cover.

Copper cyanide solution being analyzed by using General Electric galvanometer with Patwin Model C1 electro-polarizer.

★ ★ ★

Brass Cleaner

A non-fuming bright dipping agent for brass and copper is being manufactured by the Thor Chemical & Equipment Corp. Containing only a moderate quantity of acid, it requires no ventilation. It will not tarnish or etch the metal being cleaned.

Called "Thor Brass Cleaner," the process consists of cold dipping, the length of time dependent upon the amount of dirt to be removed and the color desired. After satisfactory results are obtained, the work is removed from the solution and rinsed in clean water, after which it is dried in corn cob dust. Other methods of drying may be used if desired.

For further data circle No. 12 on Reader Service Card inside back cover.

★ ★ ★

Scrubbing Machine

A scrubbing machine that can efficiently remove sludge from complex shaped metal parts after the wet sanding operation in mass production metal forming shops has been developed

ACME Automatics

FOR HIGH PRODUCTION at LOW COST on

POLISHING and BUFFING • DE-BURRING
WIRE BRUSHING and MICRO-FINISHING

• Proved performance and dependability in industry for half a century

RECOMMENDATIONS and QUOTATIONS

• We will be pleased to receive blue prints or preferably finished and unfinished samples of the part you contemplate finishing together with detailed information on present finishing operation and production requirements. On receipt of samples and data we will offer recommendations and quotations.

CATALOGS ON REQUEST

ROTARY STRAIGHT LINE SEMI-AUTOMATIC AND SPECIAL *Polishing and Buffing Machinery*

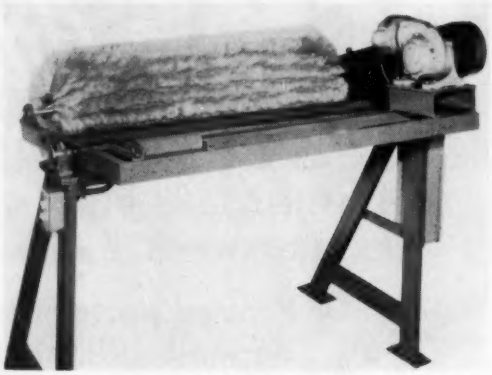
SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR NEARLY HALF A CENTURY

Fuller Scrubbing Machine



by Fuller Brush Company Machine Division engineers, who specialize in solving all types of industrial cleaning and brushing problems.

Called the Automotive Hood Washing Machine in one installation, designed for use in the automobile industry, the machine operates without an attendant.

When the automatic scrubber is installed, the frame remains stationary, straddling the conveyor belt that carries the metal sections underneath a power-driven rotating cylinder brush.

The wet sanding operation, which takes place after the primer coat of paint is applied in the manufacture of various types of metal units, leaves a sludge formed by the mixture of wet abrasive and paint particles.

Complete cleaning off of this sludge is assured because of two features in the design of the washing machine. On the one hand, the cylinder brush is counterweighted, causing the brush to rise and fall with the contour of the parts as they pass underneath. Secondly, an extra long trim on the brush, rotating at 300 r.p.m., permits access to difficult places.

Water from fixed spray nozzles directed at the brush helps remove the sludge during the cleaning operation.

For information, write to: The Fuller Brush Company, Machine Division, Hartford 2, Connecticut, or circle No. 13 on Reader Service Card inside back cover.

★ ★ ★

Filter your solutions!

50-2400 GAL/HR.

Model ASI-600. Cap. 600-900 g/hr. Sethrin* Resin Filter Assembly. Stainless Centrifugal Pump. Totally Enclosed Motor. Portable. Wt. 150 lbs. 2′x2′x2′.

*Pat. App. For

PARTIAL LIST OF MODELS

Model	Rated Capacity	Overall Size	Weight
LSI-5	50 gal/hr	11"x14"x12"	30 lbs.
LSI-10	100 gal/hr	12"x16"x16"	40 lbs.
ASI-300	300 gal/hr	2′x2′x2′	125 lbs.
ASI-600	600 gal/hr	2′x2′x2′	150 lbs.
RLS-1200	1800 gal/hr	2′x3′x3′	300 lbs.

SERVICE . . . Filters practically any acid or alkaline solution from pH 0 to pH 14; removes particles down to one micron in size. Strainer stops metallic objects.

DESIGN . . . **Filter Assembly** fabricated of stainless steel 316, high temperature lucite, rubber-lined, Haveg or Sethrin* resin. **Filter Tubes** of cotton, dynel, porous stone or porous carbon. **Pumps** fabricated of Hastelloy, stainless 316 or plastic; centrifugal or self-priming. **Motors** drip-proof, totally enclosed, or explosion proof, 110 or 220 volt, single or three-phase, 50 or 60 cycle, sleeve or ball bearing. **Hose** — special acid and alkali resistant. **Base** — Linen Phenolic laminate on rubber tire ball bearing casters.

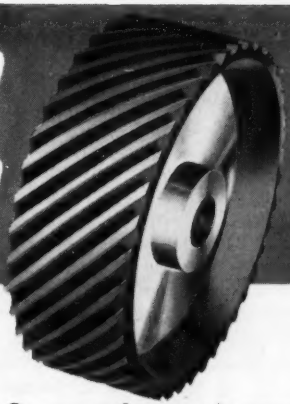
Sethco MANUFACTURING COMPANY

70-72 Willoughby Street • Brooklyn 1, N. Y.

Zinc Conversion Coating

Availability of an olive green conversion coating for use on zinc surfaces has been announced by Kosmos Electro-Finishing Research, Inc., Belleville,

CUTS COSTS like Magic!



Chicago Rubber Company's amazing new R54 contact wheel cuts better—faster—longer and will substantially reduce your grinding and polishing costs 3 ways.

This precision machined and accurately balanced wheel is easily and quickly knocked down and reassembled for tire replacement or change.

- Replace only the rubber tire when necessary instead of the entire wheel.
- Choose from a complete assortment of tire treads for different grinding operations, still using the same wheel.
- And as usual Chicago Rubber Company's R54 contact wheel allows you to get the most wear from your abrasive belt—more than you ever got before.

There is a replaceable rubber tire with proper tread for every grinding requirement and in a wide variety of durometer ratings. Write for descriptive literature.

"IT'S THE WHEEL THAT DOES THE WORK"

CHICAGO RUBBER COMPANY, INC.

Main Office & Factory
2620 N. Clybourn Ave. Chicago
Makers of the COSMOWHEEL

solution, it is of the chromate type. Called "Ker-Chro-Mite GZ," this solution is used to impart an olive green coating to zinc.

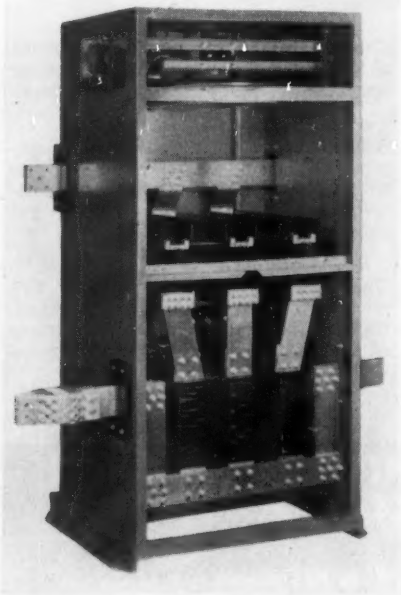
The bath, which is used at room temperature or colder, is stable, and needs only periodic replenishment with the concentrate. The film formed is an excellent base for paint, or can serve as an olive green finish, and is adaptable to many Federal Ordnance finishes.

For further data circle No. 14 on Reader Service Card inside back cover.

★ ★ ★

Selenium Plating Rectifiers

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill., has introduced a line of rectifiers including self-contained rectifiers with controls built in; basic rectifiers where no voltage regulation is necessary; remote controlled rectifiers consisting of a basic unit and separately housed controls; anodizing rectifiers; bench mounted models; and special units designed, engineered, and custom built for unusual or complex individual application. Output voltages range from 6 to 48 volts, constant or variable, in current ratings of from 10 to 5000 amperes.



Selenium Rectifier

For further data circle No. 15 on Reader Service Card inside back cover.

★ ★ ★

Immersion Heater for Corrosive Liquids

The "ThermX" immersion heater, manufactured by the N. J. Thermex Company, Harrison, New Jersey, is constructed with a pure fused quartz shell which is chemically resistant to practically all solvents except hydrofluoric acid and concentrated hot caustic solutions.

ThermX Immersion Heater

Excellent thermal shock resistance and heat conductivity are some of the main features of this unit. The "ThermX" heater is available in lengths from 10 to 34 inches, from 500 to 6000 watts and 115 to 230 volts. Heater supports are available for simplicity of mounting on various types of equipment.

For extremely severe operating con-

HARSHAW PERGLOW BRIGHT NICKEL

Harshaw Perglow Bright Nickel . . . proved with more than 227,000,000 ampere hours of successful operation.

Harshaw Perglow is ready for you NOW! For complete details write or call today.

THE HARSHAW CHEMICAL CO.

1945 East 97th Street, Cleveland 6, Ohio

Chicago 32, Ill.	Cincinnati 13, Ohio	Cleveland 6, Ohio
Houston 11, Texas	Los Angeles 22, Calif.	Detroit 28, Mich.
Philadelphia 48, Pa.	Pittsburgh 22, Pa.	New York 17, N. Y.

ditions, chemically resistant protection tubes can be supplied.

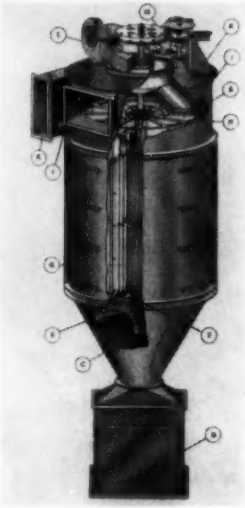
For further data circle No. 16 on Reader Service Card inside back cover.

★ ★ ★

Dust Collector

Torit Manufacturing Company of St. Paul, Minnesota, has placed on the market an automatic, self-cleaning dust collector, known as the Cyclo-Filter. Designed for heavy duty work, it will handle quantities of all types of dust, including abrasive and fibrous materials, while maintaining constant volume and uniform air flow, the manufacturer states.

The Torit Cyclo-Filter Dust Collector removes most of the dust by cyclonic action. This partially cleaned air then flows through a series of cloth filter tubes, where the remaining dust is trapped.



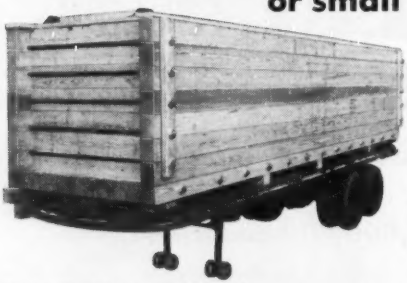
Torit Dust Collector

To keep these filter tubes at a high state of efficiency, Torit has incorporated a reverse air jet. This jet is actuated by an intermittently functioning indexing mechanism. Stopping at a group of tubes it blows clean air, in a reverse direction, through the fabric. Clinging dust particles, loosened by this action, drop into the primary air stream and are carried down into the dust container.

This method of cleaning helps to ensure continuous operation and lengthens the life of the tubes.

Torit is offering three models of this dust collector. They range in capacity from 400 to 5,000 c.f.m. All units are approximately 4 feet in diameter and require from 11 to 15 feet headroom. They may be installed either within or, with housing over the drive mechanism, outside the plant.

BIG TANKS . . .
or small



Steel mill pickling tank, 30' long, 6' wide, 5' deep. Weight, 33,000 lbs. 8" long-leaf yellow pine, 2" hardwood lining, monel metal fittings.

Kalamazoo
WOOD TANKS
quality-built to
your specifications

Free estimates and suggestions

Kalamazoo TANK and SILO CO.
233 HARRISON ST. • KALAMAZOO, MICH.

Cleaning Specialists*

*[SPE'CIAL·IST—One who devotes himself to some special branch of activity.]

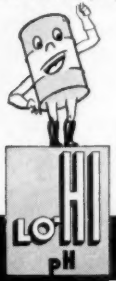
At Northwest our "special branch of activity" is solving your cleaning problems.

Behind your friendly, competent Northwest Sales Engineer stands a reputation for providing industry with low-cost, analytically-correct, job-adjusted chemical cleaners.

From Northwest's years of experience in formulating the RIGHT cleaner for your specific needs have come such developments as the LO-HI pH PROCESS—for cleaning prior to plating, painting, or vitreous enameling; ALKALUME PROCESS—for preparing aluminum and magnesium for finishing and spot welding; INTERLOX PROCESS—for phosphate coating; SPRA-LUBE—to control over-spray of "today's" paints in water wash paint booths; PAINT STRIPPERS—specific to your needs; SUPER-DRAW & FLUID FILM—for drawing metals.

Remember—YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER.

Northwest's production-tested chemicals and "Right the first time" recommendations will save you money. Northwest Service is as close as your phone.



NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

Complete information about these Torit Cyclo-Filter Dust Collectors may be obtained by writing the Torit Manufacturing Co., 314 Walnut St., St. Paul 2, Minn., or by circling No. 17 on Reader Service Card inside back cover.

★ ★ ★

Electrolytic Cleaning Process

An automatic electrolytic cleaning process for cleaning glass molds has been announced by Electrocleaning, Inc.

In this cathodic cleaning operation, molds are placed in insulated steel boxes that are fitted with special platinum anodes. A high degree of current distribution, which effects a thorough gaseous scrubbing of the mold's surface, is produced by the anode fixture and accomplished via a special hookup with a selenium rectifier.

Equipment for the process includes a full-automatic elevator-type conveyor, six treatment tanks, and selenium rectifiers. These components were designed and adapted by Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating and finishing equipment and supplies.

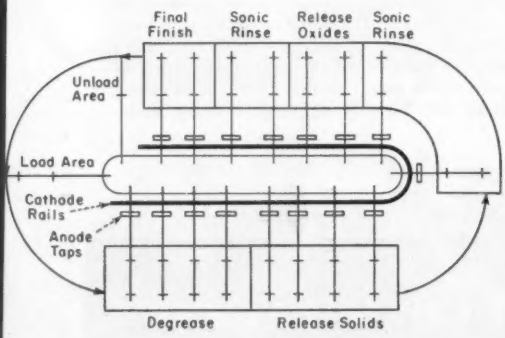


Diagram of conveyorized setup of electrolytic process for cleaning glass molds.

Residues on the glass molds are grease, graphite, sulfur, sulfides and oxides. Dirty molds are placed in their individual anode fixtures, which are then placed on the carrier arms of the automatic conveyor. Steps in the process are: degreasing; solids release; a sonic rinse; oxide release; another sonic rinse; a final finish; unloading.

Electrocleaning, Inc., is currently accepting sample molds for treatment at its Cleveland laboratory. For further information, contact A. B. MacTaggart, Electrocleaning, Inc., 2441 East 83rd St., Cleveland 4, Ohio, or circle No. 18 on Reader Service Card inside back cover.

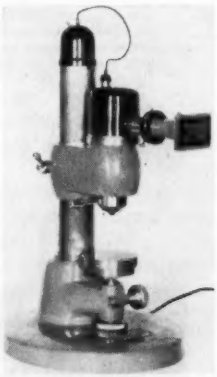
★ ★ ★

Farrand Interference Microscope

The Farrand Interference Microscope, product of Farrand Optical Co., Inc., Bronx Blvd. and E. 238th St., New York 70, N. Y., is a versatile instrument developed for measuring smoothness or roughness of polished, lapped and ground surfaces.

It is a high-power, high-resolution, optical instrument adaptable for either visual or photographic use.

The simplicity of operation of this Interference Microscope puts high precision interferometry and

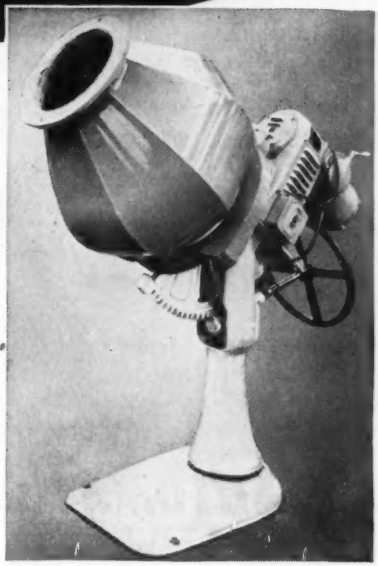


Farrand Interference Microscope, Model B.

DEBURRS 400% FASTER

SAVES 40 MANHOURS PER WEEK
with

New FLASK-TYPE GLOBE *TILTING TUMBLING* BARREL



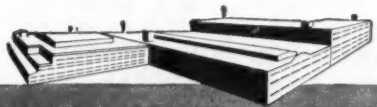
Former deburring of small precision electrical parts could be done by hand at a rate of only 40-50 pieces per hour, requiring a week for one run. One Globe Flask Type Barrel now handles the entire run of 2,500 pieces in one hour . . . a savings of 30% labor in the department. Tolerances held to .001 and .0005". These Globe Flask-Type Barrels handle steel, brass, aluminum and plastic parts with the same high output and quality finish.

Globe's new flask shell gives bigger pay-load capacity with tilting barrel control. It holds more, works faster with controlled agitation for uniform high quality parts. Low speeds for non ferrous and plastic materials.

FREE EXPERIMENTAL SERVICE

Hupp's experimental finishing laboratory will show you how to cut finishing costs. Just send samples of parts to be processed with a finished part. There's no cost or obligation.

Write Dept. F Today!



HUPP CORPORATION
GLOBE STAMPING DIVISION
1250 WEST 76th STREET • CLEVELAND 2, OHIO
SERVING INDUSTRY SINCE 1902

the possibility of measurement of surface roughness of the order of one micro-inch in the category of a shop tool rather than a highly complex laboratory instrument.

The Interference Microscope makes possible precise and detailed measurement of surface irregularities whose surface rate of change is too small to be measured or detected by electromechanical means, the manufacturer states.

Bulletin No. 818, describing two models, available upon request.

For further data circle No. 19 on Reader Service Card inside back cover.

★ ★ ★

Stainless Steel Filter

Steadfast Industries, Inc., 4731 West Madison St., Chicago 44, Ill., has announced a permanent stainless steel filter for purifying plating solutions. Tubular filter elements made of stainless steel are locked on a single support plate. This allows all of the filter elements to be removed as one unit for inspection and cleaning. The permanent filters also can be "back-washed" periodically for cleaning if desired.

Filter, showing stainless steel filter elements.

The stainless steel filter elements do not absorb and can therefore be used on either acid or alkaline solutions without fear of contamination.

For further data circle No. 20 on Reader Service Card inside back cover.

★ ★ ★

Magnesium Impregnating Process

Magnesium has been restricted in its application because of its susceptibility to corrosion. There now appears to be a solution to this problem through a new impregnating process which has increased the metal's resistance to cor-

AN AUTOMATIC RHEOSTAT

U.P.A.'s AUTOMATIC PLATING CONTROLLER

Regulator Unit

Control Panel

Electronic Brain

• Eliminates setting switches during loading and unloading tanks — Removes the possibility of "burning" small loads —Automatically controls tank current, adjusts to all loads, all solutions—Automatically checks if work is added or removed—Remote location if desired.

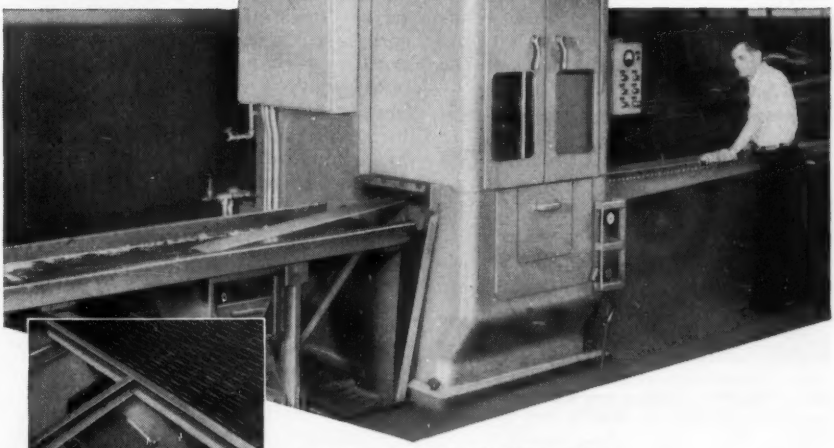
Write now for literature and a quotation form for a unit to fit your exact operation.

UNIT PROCESS ASSEMBLIES, INC.

75 East 4th St. New York 3, N. Y.

MURRAY WAY

MICRO-POLISH strip grinding boosts output over 600 percent for Michigan manufacturer



The New Murray-Way rotary filter which efficiently reclaims coolant on this operation. Permanent filtering media saves the cost of this equipment in a short time.

★ **Assures Product Uniformity**
★ **Cuts Material Loss and Scrap**
★ **Eliminates Down-time**
★ **Replaces Two Expensive Hand Operations**
★ **Facilitates Subsequent Operations**
★ **Improves Product Appearance**
★ **Eliminates Dust and Mess**
★ **Pays For Itself**

Murray-Way's Automatic Equipment, thorough experience and expert engineering can save YOU money on YOUR polishing, buffing, grinding or filtering operations. Why not give us a call . . . JOrdan 4-6890 Detroit, or write for our complete, illustrated Micro-Polish Brochure.

MURRAY WAY

MURRAY-WAY CORPORATION

P. O. BOX 180, MAPLE ROAD EAST • BIRMINGHAM, MICH.

Polishing, Buffing, Grinding, Filtering Equipment that automatically cuts your costs.

rosion. Tests were recently conducted using magnesium alloy castings and sheet. Impregnated samples were subjected to continuous salt spray for periods up to 125 hours with no evidence of pitting or metal failure, (Fig. 1, right) while conventionally treated samples corroded badly (Fig. 1, left).

"Magseal," as the new process is called, was developed by the Nu-Line Plastic Impregnating Company of Los Angeles. With this increased corrosion protection around critical areas such as precision-fit spots where dissimilar metals touch, and in alloy castings (Fig. 2), greater flexibility in the utilization of magnesium is anticipated. This process has been found to be particularly effective as a corrosion protective medium for airborne radar equipment, camera and instrument parts.

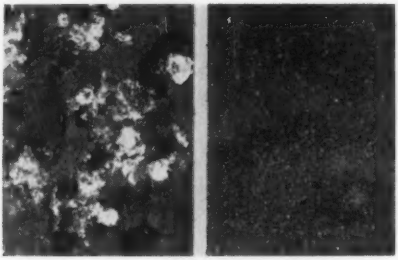


Fig. 1—Samples of castings with (right) and without (left) Magseal impregnating treatment.

Magseal is a resin combination which impregnates the metal. The resin is formulated for complete penetration into the smallest of porosities and yet has sufficient body to seal the large porosities prevalent in magnesium castings.

Further information and literature on the Magseal process is available from Nu-Line Plastic Impregnating Company, 3457 E. 15th Street, Los Angeles, Calif., or by circling No. 21 on Reader Service Card inside back cover.

★ ★ ★

Fig. 2—Typical casting upon which Magseal impregnating treatment is beneficial.

Filter Unit

Comco, Inc., Division of Enthone, Inc., 442 Elm St., New Haven, Conn., formerly known as Conn. Metalcraft, Inc., has announced a new series of cartridge type filter units designed especially for the electroplating and electroforming industries. The units are available in a variety of models ranging from 100 gallons to 5,000 gallons or more per hour.

Units are available in iron, stainless steel, rubber and plastic for use with all types of corrosive solutions. The units are easy to assemble and disassemble. Cartridges woven with a variety of fabrics including cotton, Dynel, Orlon, glass, acetate and nylon can be used.

For further data circle No. 22 on Reader Service Card inside back cover.

CIRCO DEGREASERS

NEW DESIGN

MODEL OP2

- ***Will last twice as long!***
- ***Reduce solvent costs 30% or more!***
- ***Cut labor costs!***
- ***Up to 40% less maintenance!***

NOTE THESE FEATURES . . .

1. **Unobstructed tank walls.** Condensing coil and condensate pan are recessed providing superior vapor control, effective solvent reclamation and unobstructed working area.
2. **Demand type water control.** Insures using water only when needed, thereby reducing operating cost. Placement of nickel plated condensate coils in conjunction with new type water control eliminates water condensation along the sidewalls of degreaser, thus, preventing rusting of the sidewalls and acid solvent, increasing the life of the degreaser.
3. **New pump design.** All pump parts are fabricated of stainless steel. The rotor and end plates are nickel clad. Rotating magnetic field drives impellor, thus, the pump is completely sealed except the intake and outlet, preventing leakage.
4. **Lower height.** Working height reduced for easy operation.
5. **Built-in storage tank.** Holds adequate reserve for flushing in addition to entire contents of degreaser sump.
6. **Less floor space.** Designed to operate from either side.

SINCE 1923

CIRCO

EQUIPMENT COMPANY

OVER 208 STANDARD MODELS... including Circosonic ultrasonic degreasers. All backed by nation-wide technical field service.

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PER-SOLV (Perchlorethylene) **CIRCO-SOLV (Trichlorethylene)**

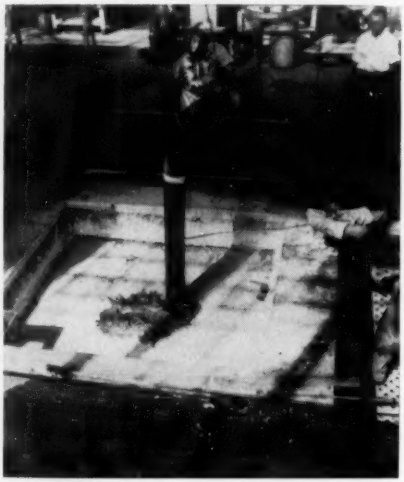
Vapor and Ultrasonic Degreasers • Metal Parts Washers • Dryers • Solvent Recovery Stills

Aluminum Bonding Process

A process for protection of steel and its alloys from both chemical and elevated temperature corrosion by metallurgically bonding pure aluminum and its alloys to the ferrous metals has been instituted by the Arthur Tickle Engineering Works, Inc., 21 Delavan Street, Brooklyn, New York, under license from the General Motors Corporation.

Cleaning of the surface to be bonded, by appropriate methods, is the initial step in the Alumicoat process. Areas that are not to be coated can be masked off. Parts are then cleaned in a steam bath. Next, the parts are fluxed in a patented salt bath to assure proper bonding of the aluminum to the metal, and then immersed in molten aluminum for a few minutes to produce a metallurgical iron-aluminum alloy bond at the interface. The aluminum penetrates the steel to a depth of 0.0015 to 0.001 inch and approximately 0.0005 to 0.001 inch of aluminum clings to the outside as the piece is extracted from the bath. The thickness of the coating is determined by the material used and the time of immersion.

Pure aluminum or any of its alloys can be used for the coating material. However, pure aluminum has been found to offer the best resistance to the attack of industrial gases and corrosive media, especially those containing sulfur compounds. Applications where both elevated temperatures and sulfurous acid were corrosive factors have proved highly successful.



Alumicoat Aluminum Bonding Process

High temperature oxidation of mild or low alloy steels can be stopped or materially reduced by the "Alumicoat" process. Tests have shown that adequate protection against oxidation is provided at temperatures at least as high as the base metal has useful strength. Temperatures at which such tests have been made with 10w carbon steel have exceeded 1900 deg. F.

Jet aircraft components, ships' boiler hot air tubes and economizer elements, diesel exhaust pipes and mufflers, and petroleum refinery equipment parts are a few examples of the possible application of the "Alumicoat" process as operated by Arthur Tickle Engineering Works.

For further data circle No. 23 on Reader Service Card inside back cover.

They're looking over the new "automation concept" Stevens *Stevadoor* which will be announced soon. Plan now to see this great new addition to the complete Stevens line of automatic metal finishing equipment. *Frederic B. Stevens, Inc., Detroit 16, Michigan.*

New Singleton "H-T Sincolite" Test Cabinet

Built to meet all U. S. Government Specifications for Accelerated Corrosion Testing

Clear Visibility — "Picture-Windows," front and rear, for wide view. Observe progress during tests without opening lid or handling the specimens. Fog can be controlled visually.

Uniform Accuracy—Users report test results within "10% of absolute duplication." New water-jacket heaters for uniform temperatures throughout. "H-T Sincolite" is non-porous, inert.

Lasts Years Longer—Exclusive Singleton Fusion-Welded "H-T Sincolite"—permanent, no leak seams. No deterioration, no maintenance, won't wear out. **The finest at the lowest price!**

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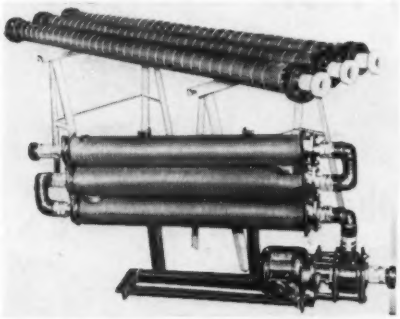
Tantalum Heat Exchanger

A tantalum jacketed heat exchanger specifically designed for use in heating chromium plating solutions is being



Tantalum Heat Exchanger

produced by Carl Buck and Associates, P.O. Box 265, Essex Fells, N. J. The tantalum units are equipped with plastic spool end pieces of Polycam, a plastic material specially developed for handling chromic acid.

The tantalum jacketed heat exchangers are suitable also for other acid heat exchange applications.

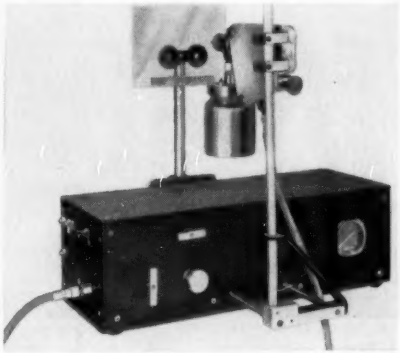
Also available from the manufacturer are Karbate pump and exchanger units for heating or cooling plating and pickling solutions. For special applications, exchangers of stainless steel, nickel, and black iron are available.

For further data circle No. 24 on Reader Service Card inside back cover.

★ ★ ★

Paint Test Panel Sprayer

A test panel sprayer that permits accurate and practical standardization of spray application is available from Eclipse Air Brush Co., 390 Park Ave., Newark, New Jersey. An aluminum box 8 inches high, 10 inches wide and 27 inches long, with an arm to hold the test panel and carry it past a fixed hand spray gun at a specific speed, the Eclipse test panel unit holds any standard spray gun at the desired distance, angle and height. Variable speeds can be read directly in inches-per-minute from a dial at the front of the unit. The eddy current speed control ensures uniform panel traverse in spite of normal air line pressure variations.



Eclipse Test Panel Sprayer

A panel of any size from 3 by 5 inches to 12 by 14 inches, can be attached to the vacuum cups. Variable

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INDIVIDUAL PIECES • ANY SIZE OR SHAPE
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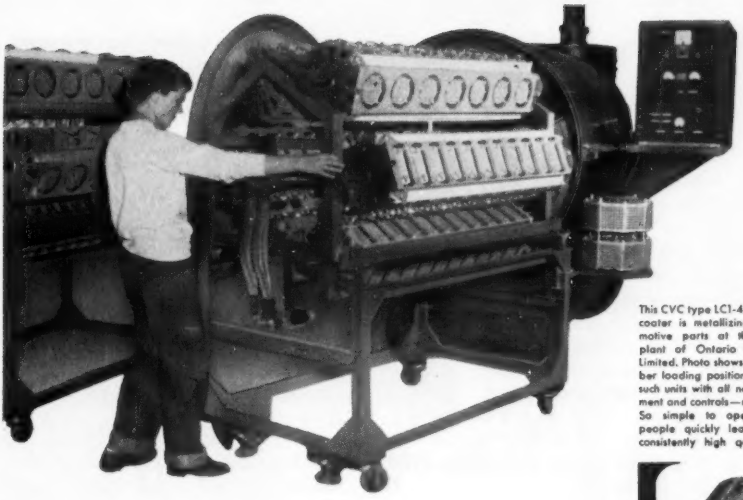


This CVC type LC1-48C high vacuum coater is metallizing plastic automotive parts at the Gananoque plant of Ontario Steel Products Limited. Photo shows fixture in chamber loading position. CVC delivers such units with all necessary equipment and controls—ready to install. So simple to operate, unskilled people quickly learn to produce consistently high quality coatings.

CVC vacuum metallizing trims cost of bright-finished automotive parts

"The economy of our new *CVC* high vacuum coater is apparent in the elimination of expensive chrome-plated stampings and two or three assembly operations," writes Mr. E. W. Carter, Works Manager, Ontario Steel Products Limited, Plastic Division, Gananoque.

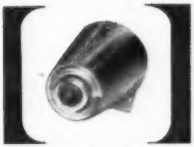
This company is using Consolidated Vacuum Corporation's 48" high speed high vacuum unit for bright coating plastic-formed automobile back-up, parking, and taillight lenses.

It's simple to operate. Load the pieces to be metallized onto the cylindrical fixture and roll it into the vacuum chamber. Throw a switch and in a few minutes a thin film of aluminum deposits on the exposed surface of each piece. A lacquer top coat provides tough, wear-resistant protection for the metallic surface.

The process works as well on basic metals as on plastic. You use inexpensive aluminum for the shiny surface. (A few ounces will coat thousands of pieces.) And you get a mirror-like finish without buffing or other finishing operations. Three production cycles an hour are easy; four are possible.

Our experience in high vacuum metallizing and associated lacquering operations is available to help you set up your own system. We would welcome a chance to discuss specific applications with you.

For further information write, wire, or phone ***Consolidated Vacuum Corporation, Rochester 3, N. Y.*** (a subsidiary of Consolidated Engineering Corporation, Pasadena, California).



Inside aluminum coating of this back-up light lens guarantees against corrosion and gives a good high-polish chrome-like finish.

This parking light lens is also a second surface coat. The metallized rim around the lens area simulates a die cast or metal bezel.

The plastic sleeve in the center of this taillight lens is vacuum coated on the inside surface.

CVC

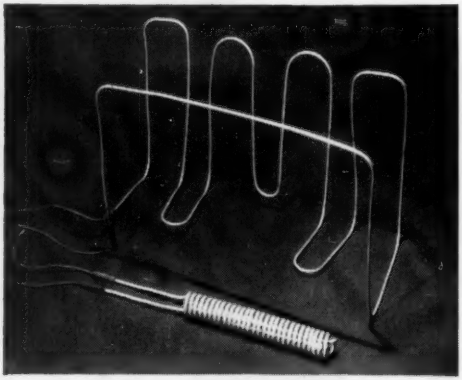
Consolidated Vacuum Corporation

ROCHESTER 3, N.Y.

Headquarters for High Vacuum

sales offices: NEW YORK, N. Y. • CHICAGO, ILL. • BOSTON, MASS. • SAN FRANCISCO, CALIF. • CAMDEN, N. J.

Westinghouse Corox Heating Units



traverse speeds from 200 to 2100 inches a minute are possible. The distance from the gun to the panel is adjustable from 6 to 18 inches, and the gun can be set vertically at any position from 6 inches above to 6 inches below the center position.

The panel sprayer is well suited to produce accurate duplication of film thicknesses for exposure, physical, salt spray and chemical tests.

For further data circle No. 25 on Reader Service Card inside back cover.

★ ★ ★

Heating Unit

Westinghouse Corox* heating units are now available in continuous lengths up to 25 feet with an outside diameter as small as 0.230 inches. These heaters, manufactured by the Industrial Heating Department, Westinghouse Electric Corp., Meadville, Pa., can be formed into shapes and sizes to heat almost any surface or enclosure.

The new single piece heater can be formed into many intricate shapes—a box to cover as many as five sides of an evaporator or freezer shelf, or the heater can just as easily be formed into a tight coil.

Neoprene covered lead wires are attached to the heater terminals and sealed under pressure to provide a positive moisture seal and mechanical strength.

Corox* heaters are made in copper, steel, aluminum, Incaloy, Inconel and other alloy tubings.

For further information, write Westinghouse Electric Corporation, P.O. Box 2099, Pittsburgh 30, Pa., or circle No. 26 on Reader Servce Card inside back cover.

*Registered Trade Name, Westinghouse Electric Corp.

★ ★ ★

Corrosion Resistant Coating

Carboline Co. of St. Louis has announced the addition of Neoprene W, a one-component neoprene synthetic coating which may be applied by brush or spray, to the Carboline line of corrosion resistant coatings. Curing takes place at room temperature. The coating is recommended for protection

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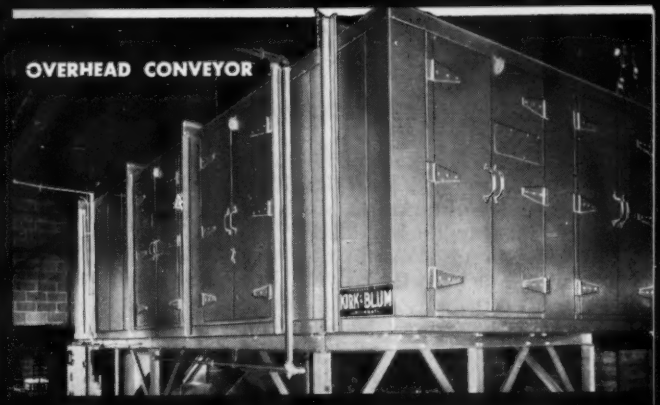

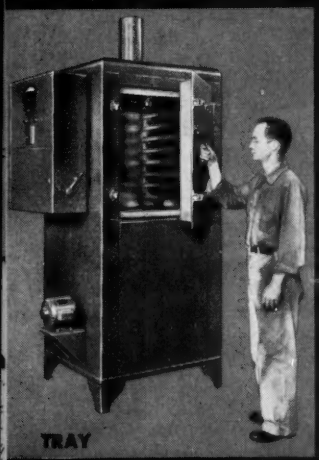

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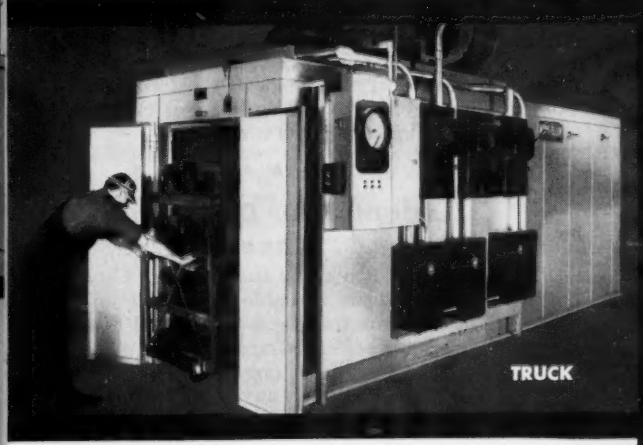
Put this skill and experience to work on your industrial oven problem. For complete information and booklet, write: The Kirk & Blum Mfg. Co., 3116 Forrer St., Cincinnati 9, Ohio.



KIRK AND BLUM
INDUSTRIAL OVENS

against acid and alkali fumes and splash, and high humidity. It shows excellent resistance to abrasion and weathering, the manufacturer states.

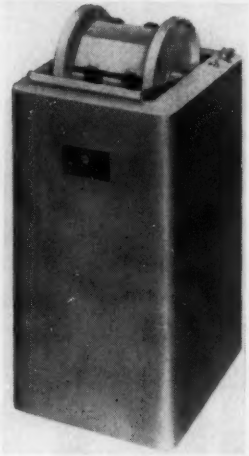
Neoprene W may be applied after wire brushing the surface to remove rust, dirt and scale. One coat of Neoprene W Primer is followed by two coats of Neoprene W for a final thickness of 8 mils. Drying time between coats is 2 to 3 hours, and surfaces so treated can be placed in service after 24 hours.

As a maintenance paint, it is recommended in applications where corrosive conditions are present. Damaged surfaces can be repaired by application of Neoprene W. For further information write the Carboline Co., 331 Thornton, St. Louis 19, Mo., or circle No. 27 on Reader Service Card inside back cover.

★ ★ ★

Small Barrel Finishing Unit

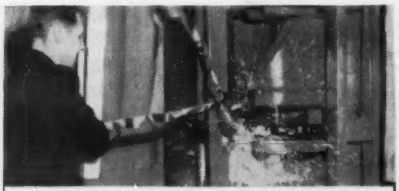
A small size barrel finishing unit designed primarily for the precision deburring and finishing of small intricate parts, short runs, or sample lots, has recently been introduced by the Speed-D-Burr Division of Miller Machine Tool and Gauge Shop, Glendale, California. Instrument manufacturers, laboratories, and manufacturers of small parts find this unit of interest.



Small Barrel Finishing Unit

Known as the Mity-Mite Jr. Deluxe, it comes complete with a 1/3 h.p. 110 volt, single phase motor. Octagonal barrel is 8 by 8 inches in size, neoprene rubber lined, with an overall height of 36 inches.

Further information on this and other Speed-D-Burr units may be had on request to the manufacturer, Speed-D-Burr Division of Miller Machine Tool and Gauge Shop, 3613 San Fernando Rd., Glendale 4, California, or by circling No. 28 on Reader Service Card inside back cover.



The christening! The *Stevadoer*, the newest addition to the complete Stevens line of automatic plating and processing equipment, will be announced soon. Write us so that your name can be placed on our announcement mailing. *Frederic B. Stevens, Inc., Detroit 16, Michigan.*

★ ★ ★

Adaptor for Deburring Wheel

Merit Products, Inc., Culver City, Cal., now has available a complete line of adaptors for use with Sand-O-Flex brush-backed deburring wheels. The adaptors make it possible to use the abrasive wheels on any shaft up to 1¼ inch diameter. The wheels are bored ½

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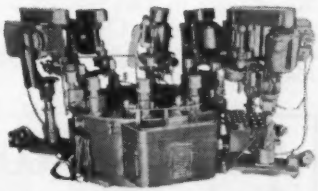
A: with **PACKER-MATICS,** of course!

Whatever your finishing requirements—buffing, polishing or deburring, regardless of shape, size or metal—Packer-Matics can do it faster, economically and with greater uniformity than hand operation. Our engineering department will be glad to show you how Packer-Matic rotary, indexing and straight-line equipment can increase your profits.

**Polishing and Buffing*

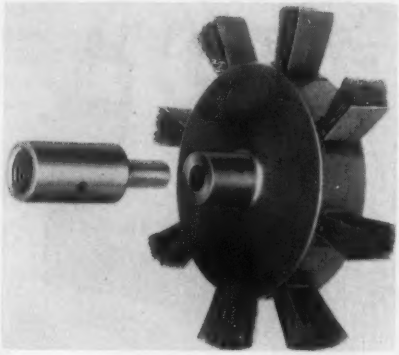


No. 13-10 ROTARY INDEXING

PACKER-MATIC

AUTOMATIC MACHINES FOR BUFFING • POLISHING • DEBURRING

THE PACKER MACHINE COMPANY • MERIDEN, CONN.



Adaptor (left) for Sand-O-Flex Deburring Wheel.

inch for the small, home-workshop model; ½ inch and ⅝ inch for the intermediate sizes; ¾ inch for the large industrial unit.

Normally, the sanding heads will fit any machine shop spindle (motor shaft, lathe, grinder, or drill press) but in cases where spindles are undersize, oversize or threaded, adaptors are necessary. Sand-O-Flex adaptors are available either for plain or threaded spindles ranging in size from ¼ inch drill chucks to 1¼-inch-7 male thread.

Complete information may be obtained from Merit Products, Inc., 4023 Irving Pl., Culver City, Cal., or by circling No. 29 on Reader Service Card inside back cover.

MORSE
VERTICAL DRUM TRUCK
ROCK-A-DRUM

Picks up 55 gal. drums, rolls them over for side draining. Becomes a rugged stand on 3" wheels.

MORSE MFG. CO., INC. 762 W. Manlius St. East Syracuse, N.Y.

Float Unit

Wilkerson Corporation has developed a new snap action automatic float unit for separating moisture and other contaminants from compressed air lines. Known as the Series 150, stock sizes are now available for ¼ to 3-inch lines. Almost any size line from ¼-inch can be accommodated as well as any volume of air. Operating pressures are 10 to 250 p.s.i.

Wilkerson Float Unit Model 150-2

The units are designed for either continuous or intermittent flow lines and operate without pressure drop and with no flutter. Because the float merely triggers the moisture discharge rather than actually opening and closing the port, efficiency of these units is high, claims the manufacturer. A built-in filter screen protects operating parts against rust and grit.

For further data, contact Wilkerson Corp., 3445 S. Platte R. Dr., Englewood, Colorado, or circle No. 30 on Reader Service Card inside back cover.

★ ★ ★

Heat Transfer Unit

Use of new metals in the construction of Platecoil, a heat transfer unit, is broadening the application of this product. Experiments at Tranter Manufacturing, Inc., of Lansing, Michigan, maker of Platecoil, prove the unit can be made of Ampco alloy, Carpenter 20 alloy, Hastelloy B and

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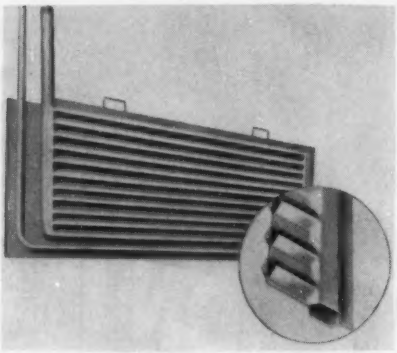


Platecoil Heat Transfer Unit

Hastelloy C.

Use of the new metals means the units can be made resistant to a much wider range of corrosive media, such as sulfuric, hydrochloric, and chromic acids. Consisting of two embossed metal sheets, welded together to provide channels for passage of heating or cooling media, the unit provides greater surface for transfer of B.T.U.

For further data circle No. 31 on Reader Service Card inside back cover.

★ ★ ★

Metallic Paint

Ready-Mixed Gold, a product announced by Duralac Chemical Corp., Newark, N. J., is offered as a solution to the problem of mixing bronze powder in vehicle. This Duralac development comes in all bronze powder shades and is suitable for spraying or dipping. It can be air-dried or baked and is applicable to aluminum, steel, cast iron and plastics.

The paint vehicle is also available as a clear liquid for users preferring to incorporate their own powders.

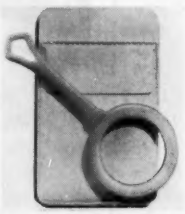
For further data circle No. 32 on Reader Service Card inside back cover.

★ ★ ★

Low head room – high lift – automatic load and unload and plenty of other "automation concept" features mark the Stevens *Stevadoer*, the newest addition to the complete Stevens line of Automatic Plating and Processing Machines. *Frederic B. Stevens, Inc., Detroit 16, Michigan.*

Surface Tension Tester

A pocket size surface tension tester has been developed by the Pollack Products Co. It provides a quick way to take accurate surface tension measurements under production conditions.



Jiffy Loop Surface Tension Tester

The test is made by immersing the clean loop end into the solution for a few seconds, then slowly withdrawing vertically. The condition of the film shows surface tension.

The Jiffy Loop is available in several standard sizes to cover the complete range of surface tension measurements. It is made of polyethylene, and is effective up to 200 deg. F.

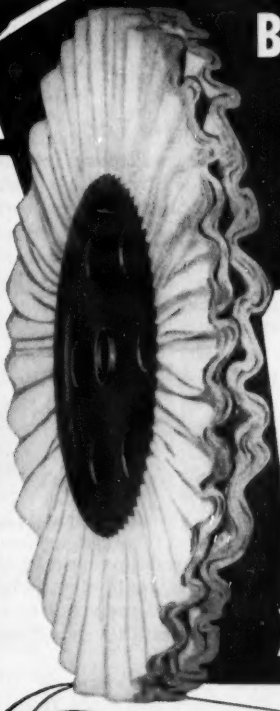
For further information, write to Pollack Products Co., 1628 E. 7th St., Brooklyn 30, N. Y., or circle No. 33 on Reader Service Card inside cover.

★ ★ ★

Drum Sander

Cone-Loc Drum Sanders, manufactured of high tensile strength aluminum

New SCHAFFNER BIAS buffs



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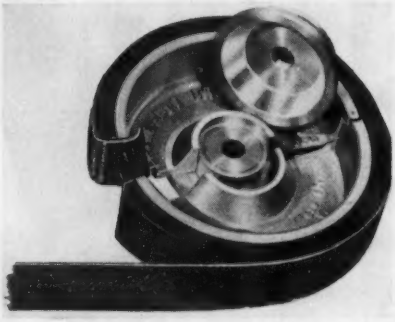

Cone-Loc Drum Sander

alloy, have just completed a full year's use in large industrial plants across the nation without a single case of structural failure, the manufacturer claims.

The new alloy was adopted when the demand for higher operating speeds outmoded other aluminum alloys.

The Cone-Loc Drum Sander is a split drum wheel that permits savings in coated abrasives, because it uses simple strips of coated abrasives torn off the ordinary "economy roll." No special end clips are required. The tool is a precision, perfectly balanced, abrasive drum and will operate safely at speeds up to 9800 surface feet per minute, according to the manufacturer.

Cone-Loc Drum Sanders are available in a variety of diameters through all of the industrial dealers handling products of The Carborundum Company. Complete information may be obtained by writing the manufacturer, American Diamond Saw Sales, Portland 9, Oregon, or by circling No. 34 on Reader Service Card.

★ ★ ★

Magnetic Tool

A hand tool for small parts handling has been announced by the Magnetool Division of Multifinish Manufacturing Company.

Called Series 70 Magnetool, it consists of a permanent magnet, a manual control lever and hand grip. It automatically picks up small parts, nails, screws, and metal scrap.

Series 70 Magnetool

Among its many applications, it can be used to separate steel particles from food, textiles and chemicals; to transfer extremely hot or cold parts; and to facilitate the handling of unsorted bulk parts.

Additional information and illustrated bulletin are available from the Magnetool Division of Multifinish Manufacturing Company, 26341 West Eight Mile Road, Detroit 19, Michigan, or by circling No. 35 on Reader Service Card inside back cover.

★ ★ ★

Porcenell Produces Silicate Coating For Ferrous Metals

The finishing industry has long faced the problem of obtaining a silicate finish on ferrous metals, produced at moderate temperatures. After fifteen

McKeon's "Liquid Sulphur"
Economical, satisfactory for
STRIPPING COPPER
and
OXIDIZING COPPER AND SILVER
Literature on request
Sulphur Products Co., Inc.
228 McKEON WAY GREENSBURG 6, PA.

years of research in this direction, the combined efforts of Vitreco, Inc., a corporation owned by Poor and Co., Chicago, Ill., and Youngstown Sheet and Tube Co., Youngstown, Ohio, have yielded dividends in the form of Porcenell, a silicate coating which can be applied to any ferrous metal. The coating is bonded to the metal at temperatures below 1250 deg. F., producing a thin coating of ceramic material on the basis metal.

Distributed by Allied Porcenell, Inc., 851 S. Market St., Waukegan, Ill., the Porcenells are composed of relatively inert materials, the silicates. They do not react with moisture, oxygen or ozone under normal conditions, and, being inorganic in nature, are not subject to organic changes. These silicates are similar to materials in use as abrasives. Thus the scratch and abrasion resistance of the film is excellent. The dielectric properties of the film are inherently good. Porcenell is bonded to the metal by iron silicates formed at the interface during fusion. Thus it is suitable for use as a base coat for paint systems, since it provides a barrier against corrosion which prevents under-film corrosion even after fracture of the paint coat.

The Porcenells are available in forms designed for use in architectural and decorative applications, as well as those designed primarily for use in corrosion protection. The former is sup-

COMPLETE CORROSION-PROOFING SERVICE FOR INDUSTRY
THE CEILCOTE COMPANY
New Catalog of CORROSION-PROOF MATERIALS FOR INDUSTRY

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Twenty-seven of Ceilcote's corrosion-proofing materials are charted, showing their resistance to 19 of the most common chemicals which contribute to corrosive conditions in all types of industries.

Write today for catalog G-201 for complete information.

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CORROSION PROOF MATERIAL AND CONSTRUCTION

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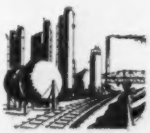
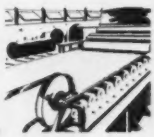
Metal Working



Chemical and Oil Refining



Pulp Paper and Textile

plied mainly as frits, which are milled with water, color oxides and standard mill additions to form a paint-like slurry that is applied to the ware. Those designed primarily for corrosion protection are available as pre-milled compounds which need only be mixed with water and color oxide to form the slurry.

After cleaning the article to be coated, it is dipped or sprayed with the slurry by conventional methods. The water still in the coating is evaporated, using heat or forced air, leaving Porcenell on the surface in the desired thickness. The ware is then subjected to fusing, using temperatures up to 1250 deg. F. It is possible to combine the firing of Porcenell with some other heating operation. Since the fusion temperature is low, Porcenell can be applied to any gauge metal with little danger of warping.

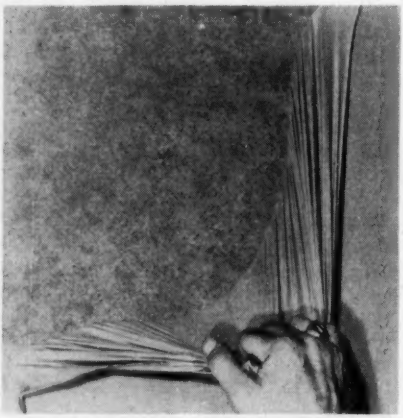
These coatings can be applied in a singe coat in a variety of textures ranging from full matte to high gloss. For maximum corrosion resistance, two coats are applied, which also gives good acid resistance. In two coat applications, the thickness does not exceed 0.005 inch thickness. Thus this coating can be punched, drilled or cut with little danger of chipback.

For further data circle No. 36 on Reader Service Card inside back cover.

"Say, this is really something!" There are plenty of production raising and cost-cutting features included on the new "automation concept" Stevens *Stevadoer* Automatic Plating and Processing Machine. Watch for the big announcement by *Frederic B. Stevens, Inc., Detroit 16, Michigan.*

Strippable Coating

Production of an aluminum-pigmented strippable coating has been announced by Specialty Coatings, Inc., division of Thompson and Co., Oakmont, Pa. Providing a method of protecting metal surfaces during interim periods, the coating is designated as PV-845, and may be applied by either brush or spray. It may be used on all types of metals during inside and short-term outside storage; on polished surfaces to prevent marring and scratching; for coating idle tools and dies; to protect against die marks in stamping operations; as a removable film on inner surfaces of spray booths; and as a web coating to completely enclose bulky objects. It requires no surface preparation and can be stripped off easily when desired. The aluminum pigment in the coating helps to provide surface toughness and assists in forestalling moisture transmission. Drying time of PV-845 depends upon thickness of coat. However, a film 3 mils thick, sufficient



Aluminum-pigmented strippable coating being removed from surface.

to provide adequate strength for stripping, will dry to handle in 5 to 10 minutes under average conditions.

Additional information may be obtained by writing Specialty Coatings, Inc., 1085 Allegheny Ave., Oakmont, Pa., or by circling No. 37 on Reader Service Card inside cover.

★ ★ ★

Agitator Selector

A selector which automatically tells the best Pneumix agitator for each liquid batch mixing problem has been announced by the Eclipse Air Brush Co., 390 Park Ave., Newark 7, N. J. It will be distributed without obligation to anyone interested in liquid batch mixing.

The selector, designated as the Capaci-Dial, is pocket sized, tough, and easy to use to determine the recommended agitator for mixing various volumes of material at three possible rates of agitation.

For further information, circle No. 38 on Reader Service Card inside back cover.

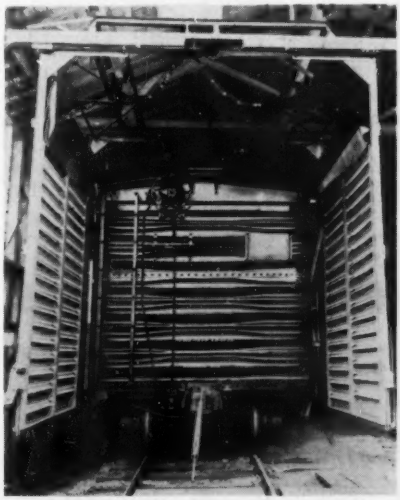
Capaci-Dial

Baking Oven for Railroad Cars

Pacific Car and Foundry Co., producer of railroad rolling stock, recently installed a self-propelled paint drying oven equipped with Corona infra red "Pyrex" tube heaters in which a box car's painted surface is dried quickly. This gives the paint a hard baked finish and the paint stays in condition much longer, eliminating frequent returns to the shop for maintenance. Cars were previously allowed to air dry. 84 Corona Model A-75 heaters, product of Corona Manufacturing Corp., 5210 San Fernando Road, Glendale 3, Calif., were employed.

Selection of the Corona Heater was made because the surface of the tube itself remains relatively cool, as Pyrex has excellent transmission properties.

For further data circle No. 39 on Reader Service Card inside back cover.



Baking Oven for Railroad Cars

Tank Rod Agitator

The Placo Tank Rod Agitator, designed for economical and dependable performance, has been introduced by Metal Finishing Manufacturing Corporation.

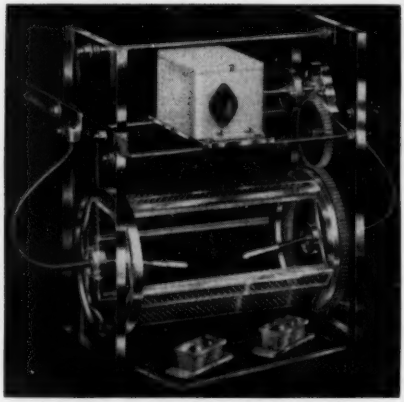
The unit is fully insulated with bakelite arm and insulated rollers. It has ball bearing, stainless steel shaft rollers, ball bearing gear box, V-belt drive to change speed, and an adjustable stroke up to 6 inches. It is easily mounted, clamps on to the tank and has telescoping extended support.

For additional information, write Metal Finishing Manufacturing Corp., 89 N. 11th St., Brooklyn 11, N. Y., or circle No. 40 on Reader Service Card inside back cover.

★ ★ ★

Portable Plating Barrel

A portable plating barrel weighing 27 pounds, designed for small quantities, has been announced by Starline Products. Fabricated in acrylic, it is driven by a geared motor. Inside barrel dimensions are 6 by 12 inches with 3/32 inch perforations. Gears and sides are ⅝ inch thick and withstand 180 deg. F. All metal parts exposed to plating solution are made of Monel. For further information, contact Starline Products, 1717 N. Main St., Los Angeles 12, Cal., or circle No. 41 on Reader Service Card inside back cover.



Portable Plating Barrel

★ ★ ★

Interior Coating for Containers

The availability of an interior coating for shipping containers, "Synthetasine 200," which provides a combination of chemical and mechanical resistance over a wide baking range, has been announced by Synthetasine Protective Coatings, Inc. The baking range recommended is 400 to 475 deg. F., although flexible linings will also be obtained over wide ranges.

Formulated for spray and roller-coat application, Synthetasine 200 is available in a gray color or unpigmented. It has been found resistant to many corrosive "hard to package" items. Among these are alkalies, detergents, dilute mineral acids, chlorinated solvents, formaldehyde (36-38 per cent aqueous), fatty acids, emulsions, alco-

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hols and aromatic and aliphatic hydrocarbons. The highly polymerized and insoluble condition of this coating indicates that it should impart no toxicity to foods, the manufacturer states. Therefore, it holds possibilities for lining containers for food products.

A leaflet describing the product is available from Synthetasine Protective Coatings, Inc., 600 Fifth Ave., New York 20, N. Y., or by circling No. 42 on Reader Service Card inside back cover.

★ ★ ★

Humidity Cabinet

A line of controlled relative humidity cabinets has been announced by the Blue M Electric Co. of Chicago.

Featuring controllable relative humidity between 50 and 99 per cent, wet and dry bulb temperatures are individually controlled by automatic thermostats. A turbo type blower at the top of the cabinet maintains uniform air flow.

Manufactured of stainless steel, cabinets are available in sizes from 1.4 to 10 cubic feet capacity. They operate on 115 volts, 60 cycle, a.c.

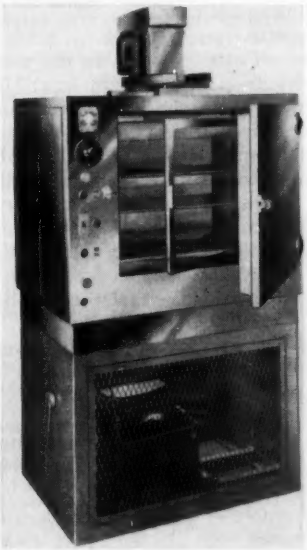
For further data, circle No. 43 on Reader Service Card inside back cover.

★ ★ ★

Mixer

Machinery designed for mixing, homogenizing, or dispersing has been announced by Gabb Special Products Division of Horton & Son Co., Windsor Locks, Conn.

Named the "Shear Flow," the mixer is available with 1½, 2, 3, or 5 H.P. motors. Design is such that it is very



Humidity Cabinet

Shear Flow Mixer

easy to clean, and parts subject to immersion are made of corrosion resistant materials. Internally lubricated ball or needle type bearings are used throughout.

The manufacturer claims excellent mixing at low R.P.M. Other desirable results from the Shear Flow are minimum aeration of materials being mixed, very little vortex formation, and no clogging of parts immersed.

For further information, circle No. 44 on Reader Service Card inside back cover.

★ ★ ★

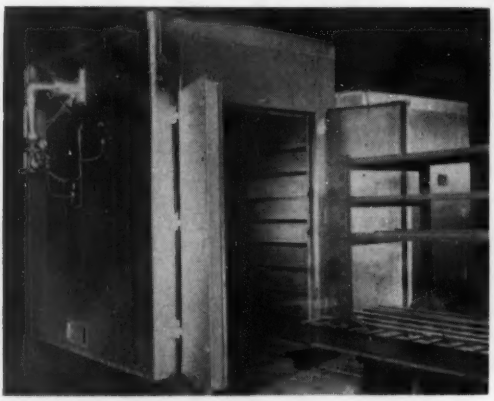
Kiln Type Oven

Michigan Oven Company, 415 Brainard, Detroit, has announced the introduction of a complete line of standard Kiln Type Ovens for baking, heating, drying and curing.

These ovens are designed to include several of the custom built features not ordinarily found in standard ovens. These construction features make it possible for the MOCO Standard Oven to maintain a high degree of heat uniformity while substantially cutting fuel consumption.

The oven is available in six sizes, with work space ranging from 4 by 4 by 6 feet to 6 by 7 by 6 feet. It operates on either gas fuel or electricity.

For further data circle No. 45 on Reader Service Card inside back cover.



Kiln Type Oven

★ ★ ★

Spray Gun

A multi-purpose spray gun is now in full production at Sharpe Manufacturing Company, Los Angeles. The company describes the new air valve-type gun, designated Model 25, as being of high performance, versatile and ruggedly built. It is a combination spray gun and quart capacity cup (screw type).

Sharpe Model 25 Spray Gun

Like all other models in the recently redesigned Sharpe gun line, Model 25 features interchangeable air nozzles having self-centering tapered seats, and fluid tips and needles. With the siphon-pressure valve set for pressure feed, the gun gives a fast spray for large work or heavy paint, states the manufacturer. Valve set for siphon feed, the gun provides easily controllable spray for fine work.

Catalog sheet G6, covering gun features, is available from Sharpe Manufacturing Company, 1224 Wall Street, Los Angeles, California, or by circling No. 46 on Reader Service Card inside back cover.

NEW BOOKS

MAINTENANCE, FINISHING, AND COLORING OF COPPER, BRASS, AND BRONZE. A 28-page publication available from the **Copper & Brass Research Association,** 420 Lexington Ave., New York 17, N. Y., gives detailed information about cleaning, maintaining, coloring and finishing copper, brass, and bronze surfaces.

Mechanical and electrolytic processes are covered in the section on finishing, together with information on organic finishing for such metals. The section on coloring presents information on solution preparation and methods of application, and enumerates the various colors which may be attained.

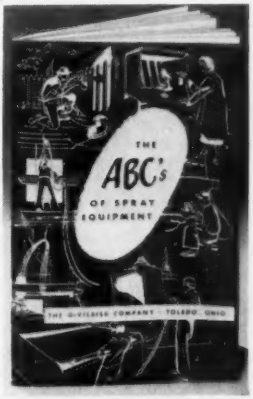
★ ★ ★

COPPER AND COPPER ALLOY SPECIFICATIONS. Anaconda Publication B-34R, containing the latest copper and copper-alloy specifications, has been announced by **The American Brass Company,** Waterbury 20, Conn., an Anaconda subsidiary. Included in this revised edition are ASTM, ASME, AWS, SAE, AMS, Federal, Military, Army, Navy, and Joint Army-Navy specifications. The new index is divided into two sections. The first is a list of the most generally used alloys made by the company, together with the applicable specifications of the agencies. The second section lists specifications in numerical order with a brief description of the material as to alloy, grade, type, temper, and anneal.

★ ★ ★

TEFLON CHEMICALLY INERT RESIN. A 60-page bulletin available from the Polychemicals Dept., **E. I. Dupont de Nemours & Co., Inc.,** Wilmington 98, Del., discusses properties and applications of tetrafluoroethylene resin. Because it is inert to such a range of chemicals and solvents, the desirability of the use of "Teflon" in making chemical-resistant valves, packings, gaskets, pump components, pipe and tubing is emphasized in this discussion. Other forms and methods of application of this material as a finish or a tape are also presented. The history, general characteristics, manufacture, composition, and coloring of this resin are also given in this manual.

THE ABC'S OF SPRAY EQUIPMENT. A basic text on spray painting is contained in the **DeVilbiss Company's** publication, "The ABC's of Spray Equipment," which is available to commercial



and industrial users of spray equipment from all local DeVilbiss sales outlets.

The 64-page booklet is written in nontechnical language and is illustrated with drawings. The booklet has a question and answer format. The questions used in the book are the most commonly asked in the company's spray painting school.

Each basic item of equipment used in spray painting is given comprehensive editorial treatment covering every phase from operation to maintenance. The booklet also can be of considerable value to spray operators because it lists the remedies for any troubles which may affect a good finish.

After a thorough reading and study of the booklet, the average spray operator can determine the spray equipment required to produce consistently high quality finishes on the items he is spraying.

★ ★ ★

PHOSPHATE COATING APPLICATION. The current issue of "Finishing Engineer," published quarterly by the **Metalwash Machinery Corp.,** 915 North Avenue, Elizabeth 4, N. J., is available upon request. This issue contains a story on a Metalwash Phosphate Coating Machine installation for the Autocar Co., and another feature on Tripoli polishing compound, and the machinery available for its removal.

NEWS of the Industry

NEW PLANTS

A huge plant, 976 feet long, has been built by the **MINNESOTA MINING & MFG. COMPANY** for the manufacture of coated abrasives. The structure (Fig. 1) houses an integrated manufacturing unit, which completes all the necessary operations for the production of coated abrasives.

Electronic, neucleonic, mechanical and air equipment are used to control machine speeds, curing temperatures, bond viscosities, and other variable factors (Fig. 2). Other equipment makes use of beta rays to measure the uniformity of coating thickness and coating weights as the coated abrasives pass through the machinery and into the drying tunnels. A battery of recorders keeps a continuous check on each operation in the manufacturing process.

The warehouse is the key to a modern materials handling system. From it, minerals and raw materials for adhesives are elevated to the top of the machinery, where they begin the processing. Minerals are gravity-fed to the coating chambers and adhesive components are placed in large mixers, then piped to the manufacturing level. Meanwhile, minerals and adhesives for the next production run are in position to facilitate a swift changeover in the process to another type of coated abrasive.

★ ★ ★

THE AMERICAN BRASS COMPANY, wholly-owned subsidiary of Anaconda Copper Mining Company, will soon construct an integrated aluminum mill on the outskirts of Terre Haute, Indiana, according to a joint announcement issued yesterday by the Anaconda president, Robert E. Dwyer, and Arthur H. Quigley, chairman of the board of The American Brass Company.

The new plant will be built on a 315-acre site in Otter Creek Township, four miles north of Terre Haute.

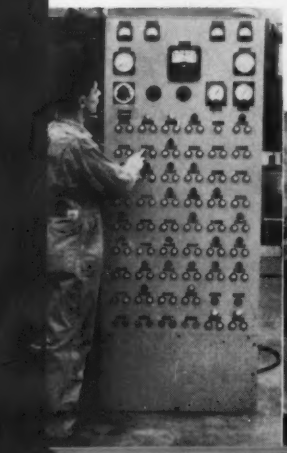


Fig. 1—(Below) New Minnesota Mining & Manufacturing Company plant for making coated abrasives. Curing ovens extend for about 900 feet along the top of the plant's first-level warehouse.
Fig. 2—(Left) This master control panel is the heart of electrical system which controls the operation of machines for coated abrasive manufacture.

COMPANIES

Practically every volume sales and production record for the Buffing Composition Division of **FREDERIC B. STEVENS, INC.**, Detroit, Michigan, was broken during the 4th quarter of 1954.

Production hit a new high in November. Sales for the month showed an increase over the same month in 1953.

New single month production records were reported during the same period at Stevens plants in Detroit, Michigan, and New Haven, Connecticut.

The company states that the main reasons for the increase in production and sales are the recently developed Stevens Bar and Stevens Liquid Stainless Compositions for the finishing of stainless and carbon steel parts.

★ ★ ★

An Airless Spray Painting Clinic and demonstration was held in the warehouse of the newly appointed distributor for **BEDE PRODUCTS INC., MARIETTA PAINT & COLOR CO.**, 2100 N. Church St., P.O. Box 1945, Charlotte 1, N. C. A total of seven sessions were held in three days, and were attended by nearly 200 executives, salesmen and technicians. At the clinic all phases of paint application problems were covered for large and small users-hot spray as well as airless spray painting. Another session was devoted to paint formulations for hot spray as well as airless spray painting.

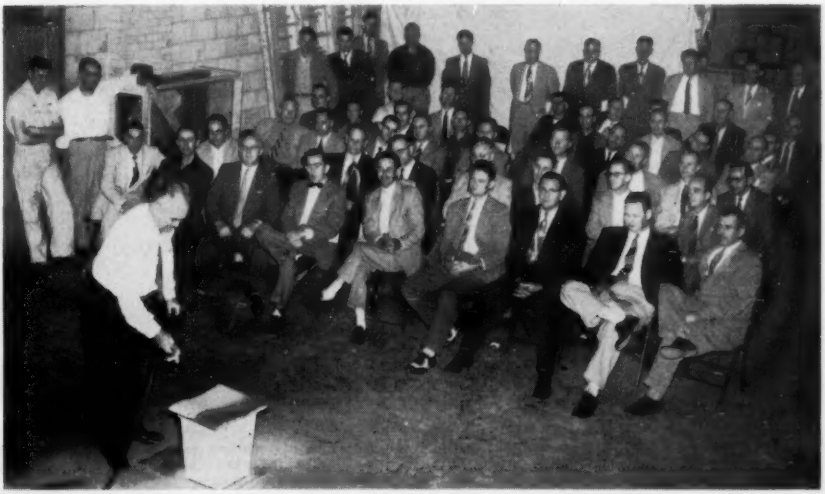
★ ★ ★

The **CARBORUNDUM COMPANY** has established a new operating unit, the "Electro Minerals Division," to manufacture and sell silicon carbide and fused alumina crudes, abrasive grain and related electric furnace products in the United States. In making the announcement, General Clinton F. Robinson, president of the firm, said that **JOSEPH S. IMIRIE,** formerly assistant to the president, will be general manager of the new division.

The Bonded Products and Grain Division in Niagara Falls, N. Y., which formerly encompassed the responsibilities now allocated to the Electro Minerals Division, will be designated "The Bonded Abrasives Division" and will specialize in the manufacture and sale of grinding wheels, sharpening stones and other bonded abrasives.

Other key promotions were announced. **GEORGE R. RAYNER, JR.**, formerly special accounts sales manager for the Bonded Products and Grain Divi-

James A. Bede sprays air dry synthetic enamel using the airless spray painting process. The demonstration stressed heavy paint applications, and a minimum of paint turbulence.



sion, was made sales manager, and **D. GEORGE VANDERHOEK**, manager of the Production Branch of the Functional Staff, was appointed manufacturing manager for the division. Manager of product engineering for the Electro Minerals Division will be **JOSEPH J. FORRESTER**, formerly manager of technical service of the Research & Development Division. **HAROLD L. SCHMIDT** will be works manager of the Niagara Falls plants of the new division, and **ELMER E. HOWARD** will be manager of the Vancouver plant.

★ ★ ★

WYANDOTTE CHEMICALS Industrial Representatives recently attended a week-long "refresher" school.

Those attending the school were: R. Esten, Los Angeles; D. Booth, Chicago; J. Hennessey, Philadelphia; Andrew Liger, in charge of Industrial Research Laboratories; Ed Kubis, Technical Service Department; L. Coates, San Francisco; W. Mazan, Cleveland; F. Daly, Boston; J. Harden, Montreal; W. Lee, Atlanta; H. Skinner and Oscar Anderson, Wyandotte Research Laboratories; E. Bartos, Detroit; R. F. Warkow, Research; E. Bedard, San Francisco; L. McCoy and A. Hannah, Research Laboratories; R. J. Racine, manager Industrial Sales and C. T. Dumont, Cincinnati.

All aspects of industrial cleaning operations were covered in the Wyandotte seminar, including paint stripping, electrocleaning, spray washing, phosphatizing, and deoxidizing aluminum.

★ ★ ★

Vice president **FRANK W. JUDSON**, dean of Pittsburgh Plate Glass Company's sales organization, retired January 3. A native of Farmington, Minnesota, Mr. Judson had been associated with the firm for 60 years.

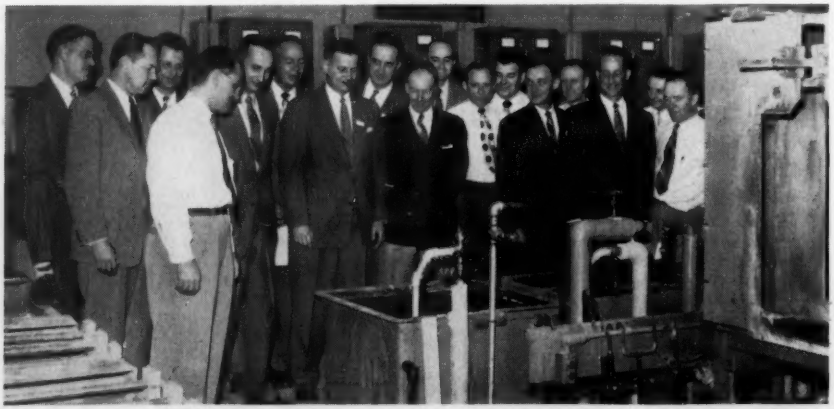
He joined the merchandising division as a salesman at Minneapolis, later served in sales capacities at Davenport, Iowa, and as manager of the firm's Omaha, Nebraska, branch.

Transferred to the firm's general offices in Pittsburgh in 1927, Mr. Judson was appointed director of sales the following year. He was elected vice president in 1935.

★ ★ ★

The **DOW CHEMICAL COMPANY** has announced the opening of a new field sales office in New Orleans to serve Louisiana, the southern half of Mississippi, southwestern Alabama and northwestern Florida.

Donald Williams, vice president and director of sales, said the office, located at 925 Common St., was established to provide improved service for customers in the four-state area. It is under the



Wyandotte Chemicals industrial representatives are shown attending one of the sessions during a week long "refresher" course at Wyandotte research laboratories. Some of the 18 cleaning, electrocleaning, and electroplating tanks are shown in the background. At the far right is the feed end of Wyandotte Chemicals' multi-stage spray washer.

direction of Glenn H. O'Neal, manager of the company's St. Louis, Mo. office.

The staff will include Louis O. Litherland, Jr., specializing in general chemicals; Richard F. Lee, Dowflake; Albert E. Weil, agricultural chemicals and John J. Sheppard, Jr., office salesman for all products.

★ ★ ★

John Jumer, president of **ELECTRO-GLO CO.**, Chicago, Ill., has announced the appointment of **LaSALCO, INC.**, St. Louis, Mo., manufacturer of equipment for the electroplating and polishing field, as a distributor for Electro-Glo electropolishing concentrates.

★ ★ ★

The opening of a branch plant has been announced by **COMET CHEMICAL CO., INC.**, Newark, N. J. Located in Cupey, Puerto Rico, the branch has been named Comet Coatings, Inc. The new plant has been opened to handle trade in the West Indies, Central and South America.

It is located on five acres of ground adjacent to San Juan harbor, and is prepared to supply a full line of industrial lacquers for wood and metal, thinners, interior and exterior paints, and related products.

Alexander A. Ross, treasurer of the company, will be in charge of all products manufactured and shipped from the Puerto Rican plant.

★ ★ ★

TECHNIC, INC., has opened an office at 7001 North Clark Street, Chicago 26, Ill. Growing use of electroplated precious metals for industrial, scientific and decorative applications prompted the step, according to Technic officials, to provide prompt service in Chicago and surrounding areas.

Technic, Inc., produces precious metal plating solutions and equipment, including potassium gold cyanide, sodium gold cyanide, rhodium sulfate, palladium plating solution, platinum plating solution, immersion tin, and Protectox silver and copper anti-tarnish.

★ ★ ★

Oakite Rustripper, the recently announced alkaline deruster, will be featured by **OAKITE PRODUCTS, INC.**, at the ASTE Western Industrial Exposition and the ASM Western Metal Exposition in Los Angeles in March.

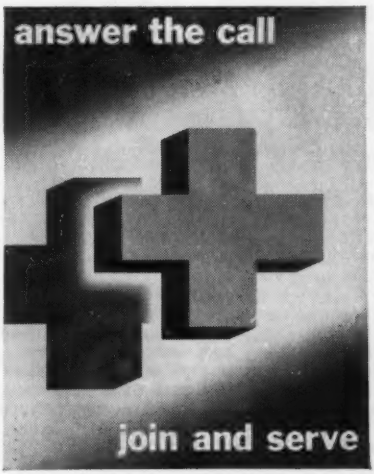
Designed primarily for the removal of rust and heat scale from parts where dimensional change and acid embrittlement must be avoided, Oakite Rustripper is said to be effective with only an alkaline soak and a rinse. According to the manufacturer, there is no danger of over-immersion; once the rust is removed, all action stops. The material may be applied in hot or cold solutions, with or without cyanide, and with or without current. The stripper has been used to remove light heat scale from titanium, strip paint coatings and clean molds.

The Oakite booths will also feature the Oakite CrysCoat Process of iron and zinc phosphate treatments; electrocleaning; barrel finishing, and drawing compounds; and materials for paint spray booth water treatment.

Personnel at the booths will include P. A. Boeck, J. C. Leonard, C. S. Rankin, C. A. Peterson, T. A. Rohlfsen. G. H. Boeck, J. F. Violette, J. E. Spratt, R. R. Webb, J. W. Miller, P. V. Rogers, L. B. Nerheim, John Mackesy, and C. T. Maier, of Oakite's field service staff. Oakite will have Booth 880 at the ASTE Industrial Exposition, and Booth 680 at the ASM Metal Exposition.

NEW POSITIONS

The Biaf Buff Division of **SCHAFFNER MANUFACTURING COMPANY,**



INC., Emsworth, Pittsburgh 2, Pa., has recently opened a new plant. Products manufactured in the new plant include Schaffner Metal Cleaner, Bias Air Cooled Buffs in all diameters, centers, plys and counts, and Schaffner No Nubbin Buffing Compositions.

★ ★ ★

JAMES S. HUBBARD, Boston, and **CHARLES J. MARTIN,** Buffalo, are newly appointed sales managers of Wyandotte Chemicals Corporation district offices.

Mr. Hubbard, a native of Richmond, Virginia, has represented Wyandotte Chemicals as a salesman for 6 years.

Mr. Martin, a native of New York City, has represented Wyandotte Chemicals in that area for over 6 years. He has studied at New York Business Institute, served 5 years in the U. S. Coast Guard, and has worked for an auto-truck body manufacturer.

Both Mr. Hubbard and Mr. Martin have field experience in industries served by Wyandotte Chemicals' cleaning, washing, germicidal, metal cleaning and absorbent products, and have been given training at the Wyandotte Chemicals Technical Service laboratories.

James S. Hubbard (left), Charles J. Martin

★ ★ ★

Norton Company has named five new officers and one new director. Two retirements have been announced.

EDWIN E. McCONNELL has been elected treasurer succeeding **WILLIAM J. MAGEE,** who has retired. Mr. Conne'l has been controller since 1941 and a Norton director since 1951.

(Upper left) Edwin E. McConnell, (upper (right), William J. Magee, (lower left) William H. Perks(lower right) Robert D. Lawson.

WILLIAM H. PERKS has been appointed controller to succeed Mr. McConnell and elected a director replacing Mr. Magee on the board. Mr. Perks has been assistant controller since 1948.

ROBERT D. LAWSON has been elected to the new position of vice president and sales manager for the company's Grinding Machine Division. He has been sales manager since 1951.

RICHARD PROUTY was made secretary of the company succeeding **MALCOLM N. PILSWORTH,** who has retired. Mr. Prouty has been assistant to the treasurer since 1951 and assistant secretary since 1953.

FAIRMAN C. COWAN has been elected clerk of the corporation succeeding Mr. Pilsworth. He was also appointed assistant secretary and will replace Mr. Pilsworth as general counsel.

George N. Jeppson was re-elected chairman of the board and Milton P. Higgins re-elected president.

Norton directors appointed the following officers: John Jeppson, vice president in charge of manufacturing, Abrasive Division; Mr. Johnson, vice president in

charge of sales, Abrasive Division; Mr. Moore, vice president in charge of national accounts; Mr. Hicks, vice president and general manager, Grinding Machine Division; Mr. Kelso, vice president in charge of foreign oprations; Mr. Howe, vice president in charge of research and development; and Mr. Lawson, vice president and sales manager, Grinding Machine Division.

★ ★ ★

E. W. Glaeser, president of Gasway Corporation, 6463 N. Ravenswood Ave., Chicago 26, Ill., manufacturer of equipment for metal-treating and roller-coating processes has announced the election of **R. R. TEASDALE** as executive vice-president of the company.

R. R. Teasdale

Since 1946, Mr. Teasdale has been successively Gasway's development director, chief engineer, industrial coating manager, and recently, general manager.

★ ★ ★

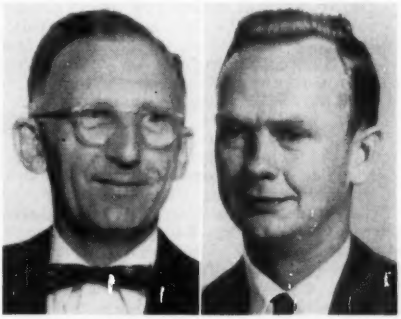
James A. Gailey

The **ALVEY-FERGUSON CO.**, 666 Disney St., Cincinnati 9, Ohio, has acquired The Cincinnati Automatic Conveyor Co. and the manufacture of its "Trol-e-veyor" light-weight, easily-installed overhead conveyors. **JAMES A. GAILEY**, inventor of the "Trol-e-veyor" conveyor and former owner of The Cincinnati Automatic Conveyor Co., has joined the Alvey-Ferguson Sales and Engineering Staff.

Mr. Gailey, a resident of Cincinnati and a graduate of the University of Cincinnati in mechanical engineering, has had wide experience in both sales and product engineering before he developed the "Trol-e-veyor" system. A veteran of World War II, Mr. Gailey served in several theaters of operation as a pilot with the U. S. Air Transport Command.

★ ★ ★

R. O. Hull, president of R. O. Hull & Company, Inc., Rocky River, Ohio, manufacturer of electroplating specialties, has announced the appointment of **JOSEPH L. JACKSON** as head of Research and Development. Mr. Jackson received his Bachelor of Science degree in chemistry from the University of Michigan in 1948 and his Master's degree from Case Institute of Technology in 1952. Prior to joining the Hull Co., he was engaged in research for the past six years at the laboratories of the National Advisory Committee for Aeronautics at Cleveland, Ohio.



L. R. Critchfield (left), Joseph L. Jackson

L. A. CRITCHFIELD has joined the sales and service department as technical representative serving southern Ohio, Kentucky and West Virginia. Roy Critchfield brings to platers in that area his wide experience in plating production and supervision as well as his well qualified background in the territory as a field service engineer. Headquarters for the area are in Dayton, Ohio.

The R. O. Hull Company, recently completing its tenth anniversary in the field of developing and manufacturing addition agents for electroplating, will soon occupy its new main office and laboratories now nearing completion adjacent to the present plant site. The one-story brick building, consisting of 4,500 square feet of floor space, was added to make room for new products and processes research, and customers service administration.

The former office and laboratory space

will be taken over by manufacturing activities which are currently being increased 50 per cent.

MEETINGS

The **DAYTON BRANCH, AMERICAN ELECTROPLATERS' SOCIETY,** will hold the **TENTH ANNUAL EDUCATIONAL SESSION AND DINNER DANCE** on Saturday, February 19, 1955, at the Dayton Biltmore Hotel.

Three papers will be given at the Educational Session, beginning at 1:30 P.M. Clarence Van Derau, general works manager, Westinghouse Electric Corp., and past president of the A.E.S. will serve as honorary chairman. The speakers and their topics are as follows:

1. "Chemistry of Electroplating," by Dr. R. B. Saltonstall, technical director, The Udylite Corporation, Detroit, Mich.
2. "Electroforming as Applied to the Manufacture of Phonograph Records," by Dr. A. M. Max, Engineering Division, RCA Victor Corporation, Indianapolis, Indiana.
3. "Soldering," by E. R. Bowerman, Physics Laboratories, Sylvania Electric Products Co., Flushing, N. Y.

The Dinner Dance in the main ballroom of the Dayton Biltmore Hotel will start at 6:30 P.M. Tickets are available at $6.50 per plate. For tickets and reservations, contact Jack Baker, 5025 Lauderdale Dr., Dayton 9, Ohio.

★ ★ ★

The **KANAWHA COATINGS SOCIETY** will present the **SECOND ANNUAL COATINGS FORUM** on the evening of February 22, in Charleston, W. Va.

The theme of the meeting this year will be "Maintenance Painting as Related to Testing and Evaluation." Three panel members will be on hand to answer questions. Representing new products and future developments will be Dr. Raymond B. Seymour of Atlas Mineral Products; Francis Schofield of the National Paint, Varnish and Lacquer Association will discuss the problems in testing coatings and evaluation of the test results; Dr. Fred C. Weber of the Phelan-Faust Paint Manufacturing Co. will represent the St. Louis Coatings society at the meeting and act as moderator. All problems related to the practical aspects of surface preparation, coating application, testing and use will be discussed.

A social hour and dinner will precede the program. Reservations may be procured from the Kanawha Coatings Society, Box 564, Charleston 22, W. Va. All persons interested in coating problems are invited to attend.

★ ★ ★

The tentative program for a **CORROSION CONFERENCE** to be given by the **UNIVERSITY OF TENNESSEE,** Knoxville, in cooperation with the **NATIONAL ASSOCIATION OF CORROSION ENGINEERS** has been announced. The 4-day conference will be held at the Carolyn P. Brown Memorial Center starting March 1, and will cover fundamentals, atmospheric corrosion, corrosion by gases, catastrophic corrosion, aqueous corrosion, corrosion by chemical solutions and by molten salts and metals, mechanical factors in corrosion, underground corrosion, coatings and a panel discussion.

The last day of the conference will be devoted to a tour of Oak Ridge.

★ ★ ★

The **LOS ANGELES BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** will hold the **25TH ANNUAL TECHNICAL SESSION AND DINNER DANCE** on Saturday, March 19, at the Hotel Ambassador in Los Angeles.

An outstanding technical program has been planned, in view of the fact that this is the Silver Anniversary of the Los Angeles Branch.

★ ★ ★

Cleveland will be the site of the **1955 INDUSTRIAL FINISHING EXPOSITION.** The show is to be held in the Cleveland Public Auditorium on June 20, 21, 22 and 23 in conjunction with the **42ND ANNUAL CONVENTION** of the **AMERICAN ELECTROPLATERS' SOCIETY.**

Cleveland is a fortunate choice for several reasons:

1. Sixty-three per cent of American industry is located within a 500 mile radius and more than half of the 8,000 plating plants are within an overnight trip of the city.

2. The state of Ohio has over 1,500 plants employing more than 300,000 persons in various phases of finishing.

Diversification is the keynote of the industrial finishing industry in Cleveland itself. Cleveland plants finish all kinds of equipment from small jet engine parts to huge parts for secret machinery. Operations included are: electroplating, enameling, lacquering, vitreous or ceramic finishing, electropolishing, chemical finishing and anodizing.

It has been estimated that approximately 12,000 finishing plant personnel

Fig. 1—(Above, left) Dr. Ralph Schaefer, National President, A.E.S. (left), Joseph Gurski, President, Detroit Branch A.E.S.
Fig. 2—(Above, right) Shown examining a display of plated parts exhibited at the meeting are: (left to right), Fred Olmstead, Studebaker-Packard Corp.; Robert H. Dudley, United Chromium, Inc.; Dr. George Dubpernell, United Chromium, Inc.; Charles C. Conley, Houdaille-Hershey Corp.

will attend the 1955 convention and show. A full round of activities has been planned for them.

Included in these activities are trips to various plating and finishing plants in the Cleveland area.

The convention affords opportunities for the exchange of information so essential to the continued progress of the industry as a whole.

An idea of the importance of the coming meeting to manufacturers of equipment can be formed from a recent report by Harold Bartlett of the American Decorating Company, exposition manager of the 1955 show. The report states that more space has already been contracted than for any previous show held by the American Electroplaters' Society.

SOCIETIES

The **ANNUAL TECHNICAL SESSION** of the **DETROIT BRANCH** of the **A.E.S.** was held on Dec. 3, 1954, in the Statler Hotel. In attendance were approximately 200 members and guests.

President Joe Gurski opened the meeting, designated as National Officer's Night. He introduced P. Peter Kovatis, executive secretary of the A.E.S. and managing editor of "Plating," who told

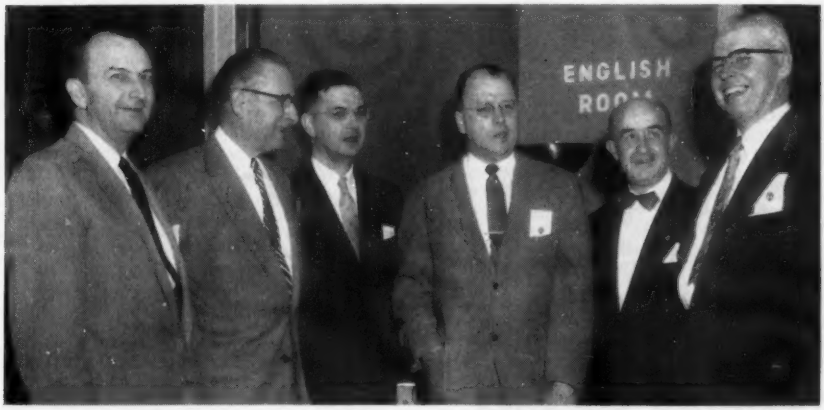


Fig. 3—A number of past presidents of the A.E.S. were on hand for the Detroit Branch Annual Meeting. Shown (left to right) are: C. F. Nixon (1952), C. C. Conley (1943), Dr. Ralph A. Schaefer (current president), E. T. Candee (1942), W. L. Pinner (1946) and M. R. Caldwell (1945).
(Photos courtesy Detroit Branch A.E.S.)

the members of the present status of the A.E.S. publication, and invited all members to see the improvements and modernization in the national headquarters.

Charles Conley, Houdaille - Hershey Corporation, honorary chairman of the evening, introduced Dr. Ralph A. Schaefer, Clevite Brush Development Co., and president of the A.E.S. Dr. Schaefer pointed out that it would be desirable to have every branch contribute papers on various phases of plating every four or five years.

Dr. Schaefer presented a talk on "A Qualitative Study of Macro and Micro Metal Distribution in Plating Baths." The talk covered qualitative data for macro and micro metal distribution. The data was obtained by the plating of cyanide copper and silver, chromium, nickel, stannate tin and electroless nickel on flat and formed cathodes with or without pores. Numerous slides were shown giving evidence of the conditions of micro and macro throwing power. It was shown that electroless nickel has good penetration qualities, and also that acid solutions penetrate better than cyanide baths. Studies were made of various nickel baths.

Dr. George Dubpernell, United Chromium, Inc., presented a talk on "Industrial Uses of Electroplating Processes." Slides were shown giving the plating solutions that have greater efficiency—such as cadmium, gold, tin, and zinc. Other metals mentioned included: selenium, used recently on rectifiers; polonium, used for black coatings; Germanium, for rectifiers; lead, used in hot dipping; indium, used on bearings.

Dr. Dubpernell showed slides that gave approximate yearly usages of some metals plated:

Platinum	70 pounds per year
Rhodium	80 pounds per year
Gold	1100 pounds per year
Silver	500 tons per year
Nickel	1300 tons per year

On Saturday evening, December 4th, the **ANNUAL DECEMBER DINNER-DANCE** was held at the Hotel Statler. General chairman was T. Curtis McKenzie, of Klem Chemicals, Inc. In attendance were over 1600 members and guests. An excellent program included gifts for the ladies, dancing, refreshments and entertainment.

TRAINING COURSES

The second class of the Winter session of the **BINKS MANUFACTURING COMPANY'S** free **SCHOOL OF SPRAY PAINTING** will be held at the firm's Chicago plant February 7-11.

The dates for the remainder of this session are as follows: March 7 to March 11; and April 4 to April 8.

The school is open to anyone interested in, or connected with, the industrial application of paint and coatings. Previous experience is not necessary, but in the past most members have been associated with industries or firms which use spray painting equipment.

The one-week course includes discussion of such equipment as paint circulating systems, fluid handling pumps, oil and water extractors, flock equipment, compressors and all auxiliary equipment. Class members operate the equipment, disassemble it, put it back together again, and then conduct tests to see that it is in the proper adjustment.

Defects encountered in actual production finishing are deliberately produced and the students are required to analyze the fault and then make corrections.

Instruction is given by William Beacham, nationally known paint chemist and spray painting authority, who is also director of the Binks Research Department. The school is housed in special quarters and makes use of the latest audio-visual aids in the instruction.

Students with similar backgrounds or problems are grouped together wherever possible. Because the class is limited to 25 students, personalized attention is given to every problem.

There is no cost or obligation in attending the Binks School of Spray Painting. Students pay only for their living accommodations and their transportation to and from the school, located in the company's main plant in Chicago.

Because of the small size of the class, it is important that application for attendance be made as far in advance as possible. This may be done by writing E. F. Watts, Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Ill.

★ ★ ★

Two courses in surface technology will be offered during the 1955 spring term at **NEW YORK UNIVERSITY'S DIVISION OF GENERAL EDUCATION**, Dean Paul A. McGhee has announced.

FUNDAMENTALS OF PAINT, VARNISH, AND LACQUER TECHNOLOGY will present the basic principles of the manufacture and application of paint, varnish, and lacquer products. Topics to be discussed include coatings for protection, decoration, and functional purposes; raw materials used in organic

coating; manufacture of organic finishes; finishes from the user's standpoint; and testing methods.

Instructors for the course will be Dr. Myron A. Coler, adjunct professor and consultant in technical studies at NYU, and Elias Singer, technical director, Troy Chemical Company, New York City. Dr. Coler also is technical director of the Markite Company, New York City.

Sessions will be held from 8:10 to 9:55 P.M. on Wednesdays, Feb. 9 to May 25.

The Division of General Education also will conduct a seminar on **NEW DEVELOPMENTS IN ORGANIC FINISHES.** Lecturers will be Dr. Coler, Mr. Singer, and Sidney Lauren, research chemist with the Johns-Manville Corporation. The course will meet from 8:10 to 9:55 P.M. on Tuesdays, February 8 to May 31.

Some of the subjects to be discussed during the seminar are new binder materials, new pigmentary materials, and the requirements for finishes set forth by the military establishments.

Registration for the courses will be conducted at the offices of the Division of General Education, New York University, 1 Washington Square North, New York City, January 24 to February 11.

★ ★ ★

School dates for the first half of 1955 have been announced by the **DEVILBISS SPRAY PAINTING SCHOOL,** 300 Philipps Ave., Toledo 1, Ohio. Courses of instruction begin on February 7, March 14, April 18, May 16, and June 20.

Students at the school, in addition to receiving a complete insight into every phase of spray painting, are given working previews of the newest equipment developed by DeVilbiss.

The DeVilbiss instructors, in their teachings which range from the components of the spray painting equipment to actual spraying of paint by each student in the laboratory, stress every controlling factor so essential to producing highest quality results at lowest possible costs. By demonstrations, it is clearly shown that paint can be sprayed on interiors without undue overspray by controlling pressures and technique.

NECROLOGY

RALPH LEONARD SHANNON died December 4, 1954, after a prolonged illness. For many years an active member of the Chicago Branch, American Electroplaters' Society, he had been associated with the Diversey Corp. since 1943. He had served as promotional manager of the Metal Industries Department since 1949.

meetings

OF INTEREST TO FINISHERS

Feb. 19. Annual Meeting, Dayton Branch, American Electroplaters' Society, Hotel Biltmore, Dayton, Ohio.

Feb. 19. Annual Meeting, Grand Rapids Branch, American Electroplaters' Society, Pantlind Hotel, Grand Rapids, Mich.

Feb. 22. Second Annual Coatings Forum, Kanawha Coatings Society, Charleston, W. Va.

Mar. 1-3. University of Tennessee Corrosion Conference, University of Tennessee, Knoxville, Tenn.

Mar. 7. Annual Meeting, Capitol District, A.E.S., Menands, New York.

Mar. 7-11. Eleventh Annual Conference and Exhibition of the National Association of Corrosion Engineers, Palmer House, Chicago, Ill.

Mar. 10. Annual Meeting, Waterbury Branch, American Electroplaters' Society, Hotel Elton, Waterbury, Conn.

Mar. 12. Annual Meeting, Baltimore-Washington Branch, American Electroplaters' Society, Washington, D. C.

Mar. 19. 25th Annual Technical Session and Dinner Dance, Los Angeles Branch, A.E.S., Hotel Ambassador, Los Angeles, Calif.

Mar. 19. Annual Meeting, Rockford Branch, American Electroplaters' Society, Hotel Faust, Rockford, Ill.

Mar. 20-Apr. 7. 127th Meeting, American Chemical Society, Cincinnati, Ohio.

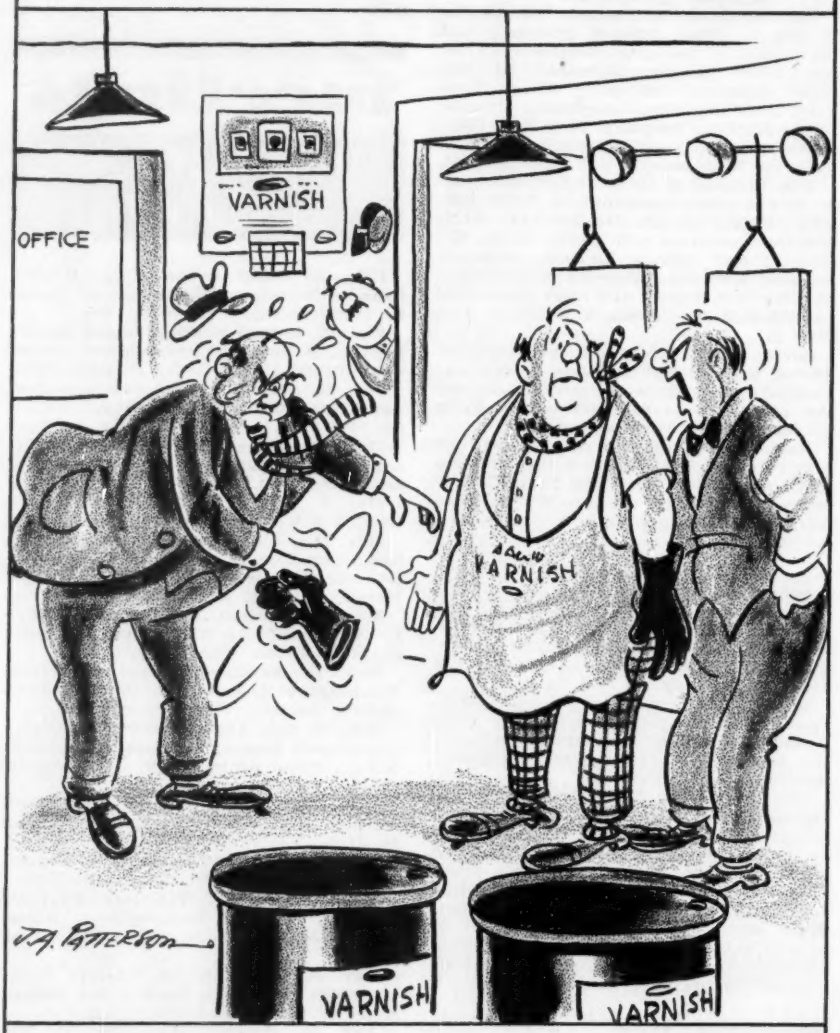
Mar. 26. Annual Tri-State Regional Meeting, American Electroplaters' Society, Hotel Deshler-Hilton, Columbus, Ohio.

Mar. 28-Apr. 1. Ninth Western Metal Congress, American Society for Metals, Ambassador Hotel, Los Angeles, Calif.

Apr. 30. Annual Meeting, Boston Branch, American Electroplaters' Society, Hotel Statler, Boston, Mass.

June 20-23. 42nd Annual Convention and 4th Industrial Finishing Exposition, American Electroplaters' Society, Municipal Auditorium, Cleveland, Ohio.

The Finishing Touch — **By J. A. Patterson**



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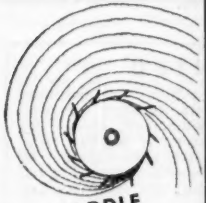

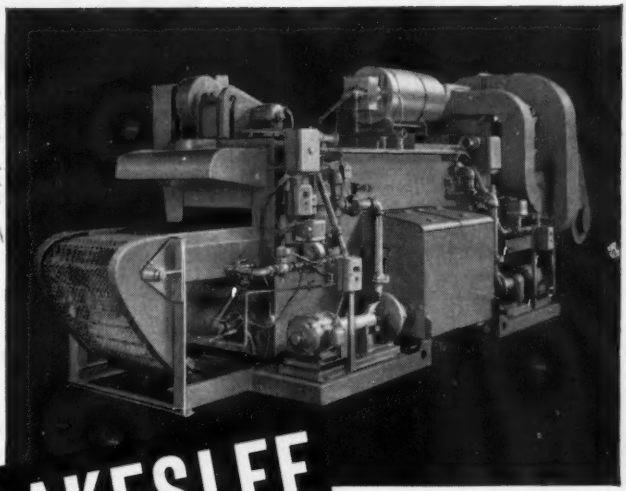

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Roller coating chemists with at least four years experience in coating field. Excellent opportunities, good salary and bonus, with pension and insurance plans. Plant located in mid-west town. Our employees know of this advertisement. All correspondence kept confidential. Write Box No. 23, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

WANTED: MANUFACTURER'S AGENTS

to develop sales of high quality metal conditioners and cleaners used in electroplating and painting. Excellent opportunities for qualified men experienced in metal finishing field. Attractive commission, repeat business. Must have contacts with large and small industrial plants in mid-west, also other territories. State lines carried. Box No. 22, Products Finishing, 431 Main St., Cincinnati 2, Ohio.

SALES ENGINEER

Thoroughly acquainted with sale of plating equipment to represent us in the Detroit area. Excellent opportunity with one of the country's leading equipment manufacturers. Box No. 24, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Man for research and development department of New England company manufacturing metal finishing products with national distribution. Must have broad experience in metal finishing and plating and be willing to travel and lecture. Ultimate position to be director of research and development. In reply give full details on technical background, experience, previous employment and salary requirements. All replies will be held confidential. Box No. 21, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

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Seeks a position that will compensate for knowledge and experience in paint finishing. Experience: Spraying — automatic, semi - automatic, conveyor line, electrostatic; dipping, cleaning, masking, designing paint racks and layout of finishing installations; color developing and matching, paint tests. Can write set-up procedures and finishing specifications. Supervisory experience includes production trouble shooting. Some sales experience in the East. Will consider relocation. Resumé on request.

Box No. 25, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

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PRODUCT LITERATURE

51. Air Powered Sander. Available from the Detroit Surfacing Machine Co., 1333 E. Eight Mile Rd., Detroit 20, Mich., is a folder describing the company's dual action air powered sander. A photograph of this sander and details as to the advantages in its use are included.

52. Surface Tension Tester. A leaflet from Pollack Products Co., 1628 E. 7th St., Brooklyn 30, N. Y., gives details on the "Jiffy Loop" surface tension tester. This simple instrument consists of a polyethylene loop with a handle, which is used to immerse the instrument into the solution being tested. It is available in a range of sizes, and provides a quick method of determining whether the surface tension is in the desired range, or whether wetting agent should be added. This leaflet gives details as to its construction and applications, and the correct size to use.

53. Paint Spraying Adapter. The Silver King Adapter, designed for attaching to any five gallon paint container and employed to keep paint in the proper spraying condition as well as to keep pigment in suspension, is described in an illustrated leaflet distributed by Silver King Corp., 1529 New York St., Aurora, Ill.

54. Rack Coatings. A pamphlet available from Chem Products, Inc., 96 Silas Deane Highway, Rocky Hill, Conn., discusses the company's line of rack coatings and stop-off materials. Compounds of the air dry, hot dip, and baking types are described. Advantages of each method and the proper "Chem-Mask" or "Chem Rack Coat" preparation to use for each are listed.

55. Blast Cleaning Machine. Pangborn Corporation, Hagerstown, Md., has announced the publication of Bulletin No. 227 describing the type RG Rotoblast unit used in the company's blast cleaning machines.

This bulletin describes the Rotoblast system, which uses the principle of controlled centrifugal force for its blasting power, and the advantages of Rotoblast in blast cleaning.

Drawings and cut-away views illustrate the construction features of the unit, pointing up its efficiency in abrasive flow and its simplicity of operation and maintenance.

56. Abrasives. The Carborundum Company, Niagara Falls, N. Y., has published a new booklet, "Abrasive Grain and Powders" for use in metal finishing. Containing informative charts and illustrations, the booklet gives Carborundum's latest abrasive engineering recommendations. Topics include "Properties of Abrasive Grain and Powders," "Elements of Metal Polishing," "Preparation and Care of Polishing Wheels," and "General Rules for Good Polishing." The booklet contains a suggested layout for a set-up room and curing room and discusses metal buffing, metal tumbling, and pressure blasting.

57. Barrel Degreaser. Details of Baronet vapor degreasers are given in a bulletin obtainable from Baron Industries, 241 W. Ave. 26, Los Angeles, California. Operational details are shown diagrammatically, and advantages given for the various models.

58. Tumb-L-Matic Bulletin. Tumb-L-Matic, Inc., 4510 Bullard Avenue, New York 70, N. Y., manufacturers of tumbling barrels and compounds for finishing metal and plastic parts and other materials, offers Bulletin P-55, entitled "Tumb-L-Matic Processes and Compounds for Tumbling Metal and Plastic Parts."

The bulletin describes dry and wet, and combination processes. It gives barrel type, compound and media specifications for cutting, definning, smoothing, polishing, lustering and other operations.

59. Latex Paint Formulations. Sales service bulletin No. B-4, available from the Chemical Sales Division, Firestone Plastics Co., Pottstown, Pa., gives typical formulations for this type of paint, based on Firestone Butaprene Paint Latices. Details are given for the preparation and mixing of these water-base paints. The properties of the styrene-butadiene copolymer binder and the film formed from these paints are also given.

60. Abrasive Belt Grinder. A description of the Marschke 3W-168 Abrasive Belt Grinder and Polisher is contained in a bulletin being distributed by the Grinding and Polishing Machinery Corp., Indianapolis, Ind. Dimensions and advantageous features, and photographs of the machine are included.

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61. Water Soluble Rust Preventive. A leaflet giving details on the Hydrin rust preventive treatment is available from the Daubert Chemical Co., 333 N. Michigan Ave., Chicago 1, Ill. This treatment provides interim protection for metal surfaces during manufacturing. Surfaces may be painted or further processed following this treatment.

62. Filter Units. Information on Comco Filter Units is presented in a folder being distributed by Comco, Inc., Division of Enthone, Inc., 442 Elm St., New Haven 2, Conn. Construction details, outstanding features, specifications, and types available for specific applications are given. Models numbers are given for specific applications, such as Model CF1-RL, which is rubber lined to enable it to handle corrosives.

63. Barrel Finishing Information. Two booklets describing barrel finishing techniques and products have been published by Minnesota Mining and Manufacturing Co., Dept. PF-25, St. Paul 6, Minn.

One of the publications, "Barrel Finishing," explains how barrel finishing works and what types of parts can be barrel finished.

The booklet also lists the complete line of "Honite" chips and compounds.

The other booklet, "Abrasive Chips and Compounds for Barrel Finishing," describes in detail the differences between "Honite" and "Super Honite" barrel finishing chips, and gives specifications for the 11 "Honite" compounds available for cutting, finishing and cleaning operations.

64. Mechanical and Fabricated Equipment. A folder available from Van Truer Co., Inc., 12600 Beech Rd., Detroit 23, Mich., shows the company's line of mechanical washers, dust and fume collectors, paint spray booths, and special fabricated equipment. The products are illustrated and described, and company services are noted.

65. PVC Valves. A circular describing "Luncor" all molded PVC valve and fittings has been published by The Lunkenheimer Co., Box 360, Cincinnati 14, Ohio. The "Luncor" valve and fittings resist most chemicals used in industry.

66. Chemical Resistant Work Clothes. Acid resistant clothing is described in a catalog available from Worklon, Inc., 253 West 28th St., New York 1, N. Y. Clothing for use in production and laboratory is pictured and described, and charts showing specific resistance of the various fabrics to many common reagents are included. Worklon chemical-resistant clothing is available in nylon, Orlon, Dynel, Dacron, cotton, and other washable fabrics.

67. Ultrasonic Cleaning Equipment. Leaflets describing various models of ultrasonic generators and transducers are available from the Pioneer Central Division of Bendix Aviation Corp., Davenport, Iowa. These machines are used to produce ultrasonic energy, and to convert it into usable ultrasound energy for cleaning and performing other functions using ultrasound energy.

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68. Micro-Polish Unit. A bulletin available from the Murray Way Corp., P. O. Box 180, Maple Rd., East, Birmingham, Mich., gives details on the Micro-Polish method of sheet grinding and polishing. Engineering specifications, operational details, typical layouts, and photographs of units now in production are included. Auxiliary equipment is also described and pictured.

69. Color Difference Meter. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md., has issued Bulletin No. 156, which describes its automatic reading color difference meter. Operational details, construction, and specifications are covered.

70. Sanding Equipment. A folder being distributed by National Air Sander, Inc., 2810 Aubnrn St., Rockford, Ill., gives details on air and electrically driven sanders manufactured by the company. Specifications are given for each model, along with general information on installation, operation and care of this equipment. Information on sanding pads and accessories is also included.

71. Ion Exchange Bulletin. An illustrated folder available from Illinois Water Treatment Co., 893 Cedar St., Rockford, Ill., describes Illco-Way HB De-Ionizers, used to obtain high purity water for use in finishing processes and for other purposes. Design features of the equipment and advantages obtained through use of the process are outlined in the folder.

72. Vinyl Butyral Resins. The latest information on properties and applications of Bakelite vinyl butyral resins is compiled in "Bakelite Vinyl Butyral Resins, Technical Release No. 11," available from Bakelite Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd St., New York 17, N. Y. Numerous graphs and tables based on recent laboratory data are included. Five basic types of wash primer, or metal conditioner, are described in detail.

73. Metal Cleaning Information. Metalwash Machinery Corporation, 915 North Ave., Elizabeth 4, N. J., offers a booklet entitled "What You Should Know About Metal Cleaning." With an introduction on the fundamentals of metal cleaning, the booklet discusses types of cleaners, the washing cycle, cleaning prior to plating, cleaning prior to painting, pickling prior to enameling, pickling in drawing operations, and metal parts processing machinery.

74. Double Roll Polisher. The Nicholas Equipment Co., Bellevue, Ohio, offers a bulletin on its Klotz type double roll mirror polisher. Operational details, applications, and specifications are given.

75. Indicating Temperature Control. Available from the Burling Instrument Co., 16 River Rd., Chatham, N. J., is a leaflet describing Model LD-1S Indicating Temperature Control. Complete specifications are given, including temperature ranges, electrical rating, size, mounting, and operation. This control is for laboratory as well as industrial use.

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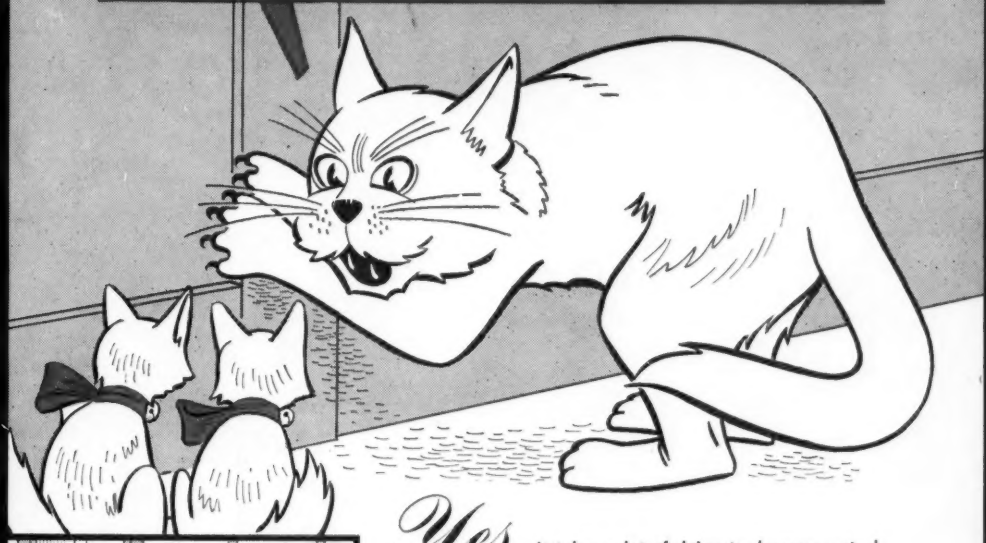

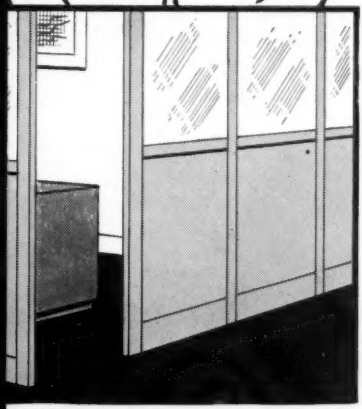

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